FSS

Meet Your Presenter





Brent Learch, EIT Solid Waste EIT



Industry Experience 4 years

FS



Capital Development and Fill Planning for Landfills Brent Learch, El | August 27, 2019





- **01** Fill Planning **Cell Development Planning** Next Cell Fill Planning **Quarterly Fill Planning** Weekly Fill Planning
- **02** Capital Development Planning

Planning provides you the **road map** needed to guide you on informed decision making regarding **operations and budgeting** at your facility.





Fill Planning

What is Fill Planning?



Why Fill Planning?

Landfill operations are **most effective** when the fill sequence **aligns** with the **other infrastructure development sequences** providing you the ability to track those metrics **to continuously improve operations**.

- Stormwater Management
- Landfill gas
 - Roads
 - Soil Borrow
 - Capping

Planning

Capita Developn Plannir

Where to begin?

Review of Existing Information





COLOR	MN ELEV	MAKIELEV	VOLUME (CY)	
	-10.35	-1.00	21,292	
188	-1.00	1.00	193.468	
	1.00	10.00	338,711	
	70.93	20.00	247,708	
	28.89	90.00	176,631	
	M.M	40.00	75,254	
	48.80	49.22	14,944	
PERIODI	453.074			

PERIOD OPERATIONS SUMMARY					
PIUL AREA	CONSUMED VOLUME	TONNAGE ACCEPTED (TONS)	PERIOD OPERATION DENSITY (J.BS/CY)		
PHASE II CRUS A, R, AND C	958,074	685,809	1,598		

NOTES:

- DROUND SURFACE TOPODRAPHY SHOWN IS A COMPLATION OF THE DECEMBER 13, 2015 SURVEY MID HISTORIC OROUND SURVEYS DATING BACK TO 2012.
 SURVEY CATA WITHIN THE Y INTERNA COVER ANEA MISA LOWERED APPROXIMATELY OPEET TO
- 2 Development of the second second
 - ASSOCIATES, INC., JUNE 2018;
- THE THREE-VEAR HISTORIC NOLLING AVERAGE IS 1.8221.85/CV.



NOTES:

1) PHASE II CELL CONSTRUCTION BARS INDICATE THE APPROXIMATE COMPLETION OF CELL CONSTRUCTION DATES.



Metro Waste Authority - Metro Park East Landfill

Phase II Cells A, B, C, and D North Life Expectancy





Time

REMAINING CAPACITIES OF PHASE II MSWLF UNIT					
FILL AREA	REMAINING VOLUME (CY)	REMAINING TONNAGE (TONS)	REMAINING LIFE (MONTHS)		
PHASE II CELLS A, B, C, AND D NORTH	2,832,189	2,194,946	37.6 (3.1 YEARS)		
TOTAL PHASE II MSWLF UNIT (CELLS A-L)	38,532,681	29,862,828	511.9 (42.7 YEARS)		

1) REMAINING TONNAGE WAS BASED ON AN OVERALL WASTE COMPACTION RATE OF 1,550 LBS/CY.

2) REMAINING LIFE IS PROJECTED BASED ON A WASTE DISPOSAL RATE OF 700,000 TONS/YEAR.

 REMAINING CAPACITY FOR FUTURE CELLS D SOUTH THROUGH L WERE CALCULATED FROM THE PRELIMINARY LINER AND FILL GRADING PLANS AND MAY REQUIRE ADJUSTMENT BASED ON THE FINAL CELL, ACCESS ROAD, AND STORMWATER CONTROL SYSTEM CONFIGURATIONS.

 REMAINING AIRSPACE CAPACITIES ARE BASED ON THE APPROVED FINAL COVER GRADES MINUS 3.5 FEET (HDR DESIGN MINUS 3.5 FEET).





NOTES:

- CY WASTE / CY BORROW CALCULATION BASED ON THE ASSUMPTION THAT ALL BORROW DURING EACH TIME PERIOD WAS USED FOR DAILY OR INTERMEDIATE COVER.
- 2) VOLUME OF BORROW BASED ON VOLUME OF BORROW REMOVED FROM BORROW AREA, NOT IN-PLACE VOLUME WITHIN FILL AREA.
- VOLUME OF BORROW CONSUMED REPORTED IN THE JUNE 2012 ANALYSIS WAS ADJUSTED IN THE CHART CALCULATIONS TO SUBTRACT THE APPROXIMATE VOLUME OF SOIL USED IN THE PHASE II PERIMETER ROAD PROJECT (APPROXIMATELY 270,500 CY, FROM JULY 2012 THROUGH OCTOBER 2012).
- 4) VOLUME OF BORROW CONSUMED REPORTED IN THE JULY 2017 ANALYSIS WAS ADJUSTED IN THE CHART CALCULATIONS TO SUBJECT THE APPROXIMATE VOLUME OF SOIL USED OFF-SITE AND IN MISCELLANEOUS INTERNAL PROJECTS. (APPROXIMATELY 44,437 CY, FROM JUNE 2016 TO JULY 2017.

Fill Sequence Plan vs. Operational Plan



Fill Sequence

Tends to be **long-term -** covering a period of one to two years.



Operational Plan Short-term, step-by-step guidance for filling your landfill.







Why look beyond 'permit level' development drawings?

Short- and long-term daily operations must be addressed.





Initial Site Development

Time Frame: Existing Landfill Height: 0'



Perimeter Site Improvements

Time Frame: Existing Landfill Height: 0'



Cell 1 Liner

Time Frame: Start Landfill Height: 0'



Cell 2 Liner

Time Frame: ~1.5 years Landfill Height: ~40'



Cell 3 Liner

Time Frame: ~3.3 years Landfill Height: ~40'



Cell 4 Liner

Time Frame: ~6.2 years Landfill Height: ~60'



Cell 5 Liner

Time Frame: ~8.6 years Landfill Height: ~60'



Cell 6 Liner

Time Frame: ~12.7 years Landfill Height: ~80'



Cell 7 Liner

Time Frame: ~17.3 years Landfill Height: ~100



Cell 8 Liner

Time Frame: ~24 years Landfill Height: ~135'



Completed Landfill

Time Frame: ~33.5 years Landfill Height: ~200





Where to Begin on Next Cell Planning?









	ISSUE	DATE	DESCRIPTION	PROJECT NUMBER	000010137165
	0	4/11/2019	ISSUED FOR CLIENT USE		
J	2				
	-				DELAKON
				CIV/II	RICARCH





2" FILENAME 00C03.dwg SHEET 00CC03











CELL E BASE GRADE EXCAVATION PLAN

2" FILENAME 00C06.dwg SHEET SCALE 1" = 120' 00C06

-




A Well-Developed Quarterly Fill Plan Optimizes your Operations

Increases Compaction Reduces Soil Usage

Minimize Double Handle Material and Waste Relocation



Forecast Drainage Issues

Effectively Plan for Capital Projects

- Closures (Interim and Final)
- New Cell Development



















Weekly Cell Planning



Average Vehicle Count





A well-developed plan optimizes your operations during adverse weather conditions.



Accessing Working Face



Minimize Leachate Generation





Maintain Safe Operations







Managing Snow and Freezing Temperatures





-		
		<

0 7/17/2018

ISSUE DATE

	SOLID WASTE	B LEARCH	
ISSUED FOR CLIENT REVIEW			
DESCRIPTION	PROJECT NUMBER	10063045	

SolidWaste Agency Iving. together. green LIFT 3A

FILENAME 01C-04.dwg

SCALE 1"= 80'

SHEET 00C-04



Capital Development Planning

Capital Development Planning

- Need a tool that is adaptable that can be updated annually
- Provides a summary not only for you, but for others to follow



What needs to be figured out in a plan?



Conceptualize What the Improvement / Addition will Look Like

- What is needed to get this done?
- Earthwork, Electrical, Water, Paving, etc.

Establish a Timeline/Hierarchy

- Does this need to be done next year or would you like it to happen in the next 5?
- How long will it take for the project to be completed?

Understand Costs

- Can this project be done in house?
- What is an estimated engineering and construction fee to get this done?
- Are any permits required prior to construction? Are they simple permits?

What makes Planning Necessary?

Expanding Operations

Compost, liquids program, customer convenience center, landfill gas infrastructure, leachate treatment/storage, etc.)

Non-Landfill Improvements

Not all property improvements are specific to the landfill itself. Roads, buildings and utilities need updates, too.

Next Steps

What needs to happen before the next cell is built? What will the landfill look like when the next cell is built? Will roads be in place for customer access? How much soil will we need to move prior to the next cell? Where could/should we put it?

Why should you have a capital development plan?





-		
-		
 - 0	05/2019	ISSUED FO
ISSUE	DATE	DESCRI
0.000000000		

		Old P	DEPRIVOL	
	100			
				-
	-			-
				_
SUED FOR CLIENT USE				
DESCRIPTION		PROJECT NUMBER	000010135581	



CAPITAL DEVELOPMENT OVERALL SITE PLAN
--

2.	FILENAME	00C01.dwg	FIGURE
	SCALE	1" = 250'	1-

4 Summary of Options

Table 4-1. Summary of Opinions of Probable Cost

Project	Fiscal Year	Construction Year	Project	Opinion of Probable Cost
1	19/20	2019	Cell D South Liner*	\$6,571,000
2	19/20	2020	CSB4 Improvements	\$538,000
3	19/20	2020	Maintenance Building 2	\$281,000
4	19/20	2020	Leachate Pond Equalization	\$288,000
5	19/20	2020	Campus Paving	\$288,000
6	19/20	2020	Compost Pad Curing Area Paving	\$599,000
7	20/21	2021	MCC Staging Area Surfacing	\$398,000
8	19/20	2020	CSB1 Improvements	\$295,000
9	21/22	2022	Truck Wash Demo and Relocate	\$203,000
10	21/22	2022	Stage II Capping	\$2,275,000
11	21/22	2022	Cell E Liner	\$11,743,000
12	22/23	2023	Cell F Bulk Excavation	\$3,414,000
			Total	\$26,737,000

Note: Opinions of probable cost are based on RSMeans and historic MWA projects at Metro Park East. Depending on the fiscal years a project is scheduled for completion, inflation is escalated accordingly. The opinions of probable cost are primarily focused towards high capital expenditures relating to the project. Additional services not included within the project description(s) will effect capital cost.

*Cell D South Liner was bid in February 2019 and expected to begin April 2019.

*Total cost for the summary of options does not include the asphalt seal treatment prices.





NDMMPELANDIPERMITNG/CELL B SEQ_STORM.DWG, Layout1, 2/2/2006 11:25:43 AM, GBrc



NDMIMPELANDIPERMITING/CELL C SEQ_STORM.DWG, Layour1, 2/2/2006 11:24-13 AM, GI



IDMMPELANDIPERMITINGICELL D SEQ_STORM.DWG, Layour1, 2/2/2006 11:22:47 AM, GE



DMIMPELANDIPERMITINGICELL E SEO_STORM DWG, Layout1, 2/2/2006 11:21:14 AM



PELANDIPERMITING/CELL F SEQ_STORM DWG, Layour1, 2/2/2006 11:18:12 AM.



NDMMPELAND/PERMITING/CELL G SEQ_STORM.DWG, Layouri, 2/2/2006 11:16:25 AM, GBr



WINDMMPELANDIPERMITING/CELL H SEQ_STORM.DWG, Layout1, 2/2/





DMMPELANDIPERMITINGICELL J SEQ_STORM.DWG, Layout1, 2/2/2006 11:10:27 AM, G



DMMPELANDIPERMITING/CELL K SEQ_STORM DWG, Layour1, 2/2/2006 11:08:21 AM, GB



NDMMPELANDIPERMITING/CELL L SEQ_STORM DWG, Layout1, 2/2/2006 11:05:08 AM, GB



C:WINDMMPELANDIPERMITING/COMP AREA S
All this info, where to start?



How far down the microscope do you need to look? Do you have GPS in your equipment?

2

Discuss current and future filling methods

Review Tonnage and historic compaction data

4

Evaluate your sites traffic loading – Is it time to change the size of your active face?

Look at current soil borrow methods and consumption rates – Do you have too little or too much?

Review long-term stormwater control features



Talk with your operators – how do they like to run things? What are the issues they are seeing?

All this info, where to start?





Prioritize the projects and consider what year these improvements should be implemented

Summarize each project and what would be included with it (civil, electrical, mechanical, F&LS)



Take a high level look at what costs would be associated with doing this work (engineering, permits, construction, additional upkeep/maintenance)



Be okay with adding projects that might not happen, just because it's in the plan doesn't mean it has to happen. Things always change and priorities are priorities.



Questions