

MEMO

**Discussion/Action
Item #: 15**



Meeting Date: January 20, 2023

To: Board of Directors
From: Senior Engineer, David Ramirez
Approved by: General Manager, Felipe Melchor

Subject: Authorize the General Manager to approve purchase of the Carlson Landfill Equipment Guidance System from RDO Integrated Controls in the amount of \$357,000 (includes 10% contingency)

Recommendation

That the Board Authorize the purchase of the Carlson Landfill Equipment Guidance System from RDO Integrated Controls in the amount of \$357,000 (includes 10% contingency).

Background

Operating landfill equipment and building a landfill requires specialized skills that differ from standard earthwork grading. Landfill Operators build the landfill structure with solid waste that arrives each day. Within any given hour, the solid waste can come in all types of shapes, sizes, densities, and moisture contents. It takes a skilled operator to manipulate, place and compact the waste such that the finished ground surface can support waste delivery vehicles, meets environmental compliance requirements, and is sloped to drain properly. The varying properties of the waste make working with it a highly skilled and specialized task. ReGen is fortunate to have several experienced landfill equipment operators who know how to work in this dynamic environment. Several of the Operators onsite have been with ReGen for over 20 years. Over the years of their experience they have learned how to work with solid waste and know the challenges that can be present.

Each day tons of waste is brought to the site to be buried. Once a landfill load arrives at the site it is dumped onto the open landfill face. Bull dozers push the waste into the fill area where another machine, aptly named a Compactor, compacts the waste to increase its density. Increasing the waste's density is crucial to ensuring that ReGen is utilizing its airspace efficiently. After the day's waste has been received and compacted it must be covered each day with either six inches of soil or must be covered with an approved Alternative Daily Cover. Each day the Landfill Team has one shot at getting the waste fill right. The fill must be left in a way that will meet standards for slope stability, adequate stormwater drainage, future vehicle access, and environmental protection.

Physical Address

14201 Del Monte Blvd.
Salinas, CA 93908

Mailing Address

P.O. Box 1670
Marina, CA 93933

Phone / Fax

831-384-5313 PHONE
831-384-3567 FAX

Web / Social

ReGenMonterey.org
@ReGenMonterey

Let's not waste this.



Currently staff has used the following methods for grade control and compaction calculations:

1. Two dimensional fill sequence plans
2. Survey staking
3. Operator's skills
4. Aerial topographic flights
5. Ground surveys

The methods described above are workable but not the most efficient method currently available. They lack real time feedback and create challenges with field markings being destroyed (survey stakes) in the process of landfilling. The equipment proposed in this request is the latest available technology in landfilling and similar systems have been available for about 15 years or more. ReGen Staff considered purchasing a landfill guidance system in the past however, the tonnages and operating needs did not warrant the investment at the time. Since the initial considerations, Global Positioning System (GPS) technology and equipment guidance systems have become more advanced and prices have fallen. Like many small to medium sized landfill facilities, ReGen has relied on its skilled operators to manage and plan the waste fills.

Given the various products available on the landfill guidance system market, ReGen staff researched the market and found four potential products to investigate. ReGen considered system from Trimble, Carlson, Topcon, and Geologic. After the initial investigation, ReGen Staff shortlisted the Trimble and Carlson systems, and initiated discussions with their vendors to determine which system to recommend to the Board for approval.

ReGen staff visit two sites to view the Trimble and Carlson systems in action. ReGen Managers and Landfill Operations Staff visited Santa Maria Regional Landfill to view the Trimble System and American Ave. Landfill in Fresno to view the Carlson System.

Discussion

Over the past few years landfill disposal tonnages have steadily increased. The increased tonnage and need for a more rapid fill rate make the investment in a Landfill Guidance System more attractive. It will enable staff to build more precisely as well as give the Operator and Management information on the compaction rates and daily fill progress.

The Landfill Guidance System operates using Global Positioning Systems (GPS) receivers. These receivers use a satellite positioning system to record the equipment's horizontal and vertical positions and compares that data to a digital terrain model that shows the desired finished grade surface. The result is presented on a display monitor in the cab that shows the Operator where they need to fill (or cut, if there is an 'overfill') and by how much. In addition, the GPS system can calculate the difference in elevation change resulting from each pass of the compactor. It can then inform the operator when they have reached the optimum compaction on a certain area and that they can move on to compact another area.



This equipment will have a significant positive impact on landfill operations. The equipment will put valuable information in the hands of the Operators and provide real time feedback on the waste fill progress and the compaction of waste. The Operators can supplement their years of experience with an accurate depiction of the waste fill progress (e.g., where they are) and the remaining fill plan (e.g., where they need to build to). As the remaining landfill base liner is developed over the next several decades, the equipment guidance system will be greatly beneficial in building the 'interim' waste fill slopes that will occur for each module development.

The proposed equipment purchase includes the following

- Three Compactor GPS kits at \$42K each = \$126K
- Three Bulldozer GPS kits at \$40K each = \$120K
- Carlson Command, Rover, GPS Base Station at \$42K each
- Installation and training \$39K

ReGen shortlisted two products that appeared to meet the needs of Landfill Operations.

- Carlson System: \$354,281.91 (10% Public co-operative purchasing discount included)
- Trimble System: \$369,579.27 (No public co-operative purchasing discount available)

ReGen Staff's selected Carlson because it provided the following values:

- Comprehensive solution for Landfill Equipment Guidance
- Deflection calculations that correlate to relative compaction
- Developed/Built specifically for landfills
- Real time update of working surface
- Real time positioning of team movements
- Cloud data for real time monitoring of performance
- Lowest price

The return-on-investment calculations were based on the efficiency expected to be gained from operating the landfill with real time feedback on compaction. With this equipment ReGen Staff expects an increase in the compaction capabilities of the Landfill Operators. Performance can be measured immediately throughout the day and Operators can tell if their means and methods are optimized for that day's waste.

A very modest increase in current compaction rates will conserve a significantly valuable amount of airspace. With only a 2% increase in waste density the site can conserve \$644,062 worth of airspace annually. Our expectation is that a 5-6% increase in density is within reach.



Density Percent Increase	Density of waste placement (lb/CY)	AUF (ton/CY)	Landfill Volume Consumed (CY/year)	Landfill Volume Conserved (CY/year)	Value of Conserved Landfill Volume (\$/year)
CURRENT	1340	0.67	786,567	-	-
1%	1353	0.68	778,779	7,788	\$ 324,673.12
2%	1380	0.69	763,509	23,058	\$ 644,062.34
5%	1449	0.72	727,152	59,416	\$ 1,659,613.18
10%	1594	0.80	661,047	125,520	\$ 3,506,069.26
20%	1913	0.96	550,872	235,695	\$ 6,583,496.05

As a public entity, ReGen Monterey is eligible to receive discounted pricing on equipment that has been pre-negotiated through cooperative purchasing agreements such as the State of Minnesota’s Co-Operative Purchasing (MCOP) Agreement. In this instance the Carlson Software and Equipment was listed in the MCOP and ReGen will receive a 10% discount on the Landfill Guidance Equipment. This discount is reflected in the prices listed in this report.

Financial Impact

This expense was budgeted in the 2022/2023 Capital Spend Plan Budget in the amount of \$500,000. The proposed equipment is expected to initially cost \$324,285 with an annual subscription cost of around \$8,000 after the first year for the Carlson Command Cloud based operating system and cellular communication subscription.

Conclusion

The addition of the Guidance System to the landfill equipment will be a significant step forward in the information that can be made available to the Landfill Operators as well as to Management.

Staff therefore recommends that the Board authorize the General Manager to approve purchase of the Carlson Landfill Equipment Guidance System from RDO Integrated Controls in the amount of \$357,000 (includes 10% contingency).