

# NEW ENGLAND CONSTRUCTION



## Construction Management & Builders Inc.

### Constructs GreenWorks Recycling Plant to Serve as Processing Model

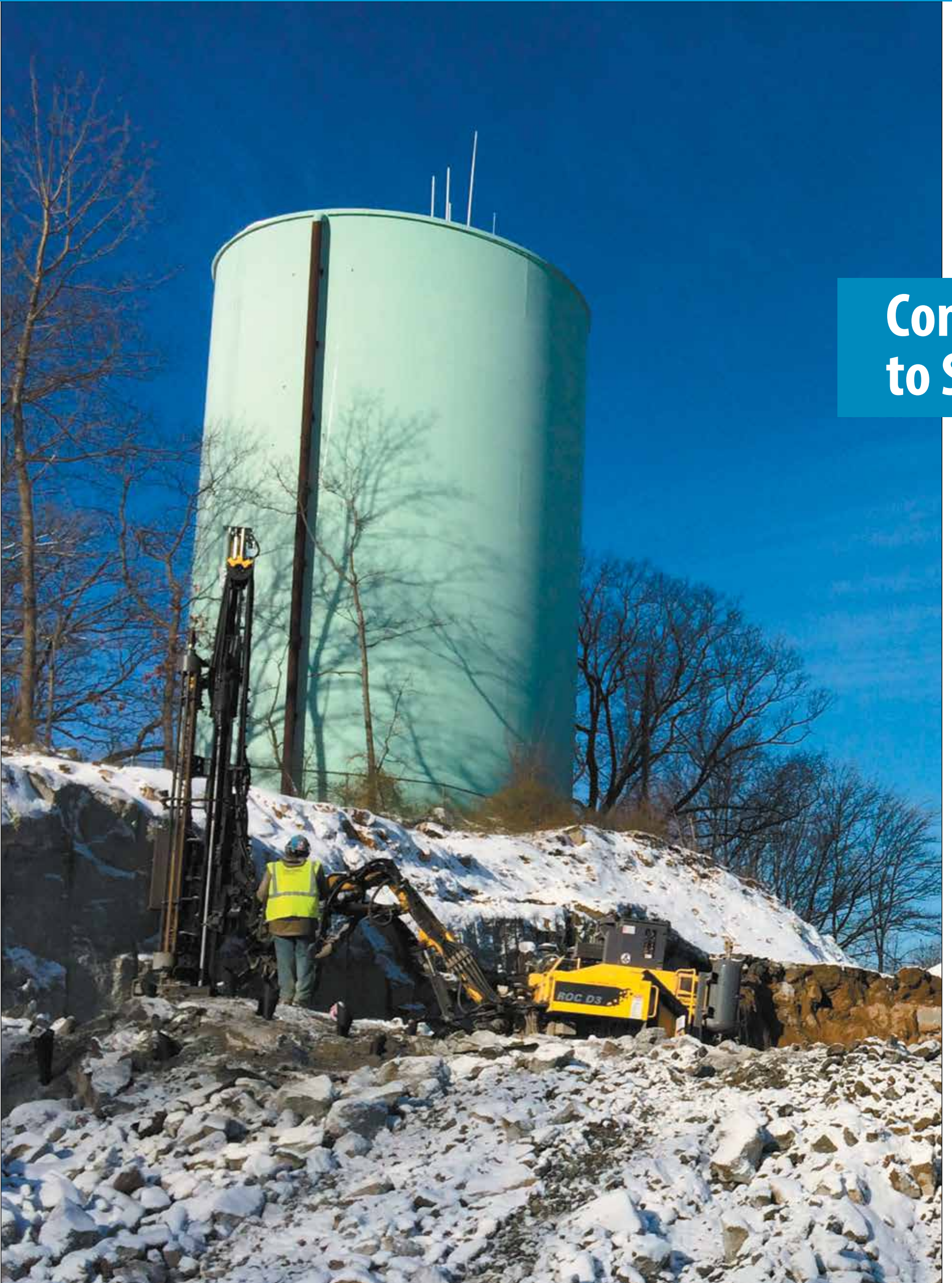
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Maine Drilling & Blasting uses an Atlas Copco ROC D3 to drill holes near water tower during construction of GreenWorks recycling facility in Peabody, Massachusetts.

# Construction Management & Builders Inc.

## Constructs Facility for JRM Hauling and Recycling at the Standard for Processing Recyclables

By Paul Fournier



A CAT mini-excavator cleans up area near water tower.

An imposing 60 foot-tall steel structure taking shape in Peabody, Massachusetts, will house the latest equipment for processing recyclable materials and may well serve as a paradigm for such facilities in the region.

"This facility is expected to be a showpiece for the materials recycling industry," said Lenord "Len" Cubellis, AIA, Senior Vice President for Construction Management & Builders Inc. (CM&B). The Danvers, Massachusetts, firm is providing construction management for JRM Hauling & Recycling Services Inc., the owner of the 50,000 square foot GreenWorks materials recycling facility (MRF).

Cubellis noted that the building design features a large mezzanine viewing deck for visiting public officials from surrounding cities and towns, state officials, engineers, and various tour groups expected to be drawn to the Peabody facility to see the state-of-the-art equipment in operation.

Located on a 4.2-acre tract just off Route 1 (Newbury Street) in Peabody, GreenWorks was designed by Concord,

New Hampshire-based H.L. Turner Group Inc., which is providing architectural and structural engineering services. An affiliate, Turner Building Science LLC, is providing mechanical and plumbing engineering.

### Sophisticated Processing Equipment

The new MRF will process dual and single stream recycling using sophisticated equipment provided by VAN DYK Recycling Solutions of Stamford, Connecticut.

In single stream recycling, all recyclable material is mixed, while dual stream recycling handles source-separated recyclables that are delivered in a mixed container stream. Materials handled may include glass, ferrous metal, aluminum and other non-ferrous metals, PET (No.1) and HDPE (No.2) plastics, and a mixed paper stream. These materials are sorted to specifications, then depending on what they are, will be baled, shredded, crushed or compacted and prepared for shipment to different markets.

For GreenWorks production, JRM Owner Jim Motzkin purchased a Bollegraaf HBC140 baler, dual paper screens and a fines screen, and two TITECH au-

tosort models from VAN DYK.

The capacity and compaction force of the HBC baler ranges from 25 to 180 metric tons (27.5 to 198 U.S. tons), enabling it to bale large quantities of waste such as waste papers, plastics, plastic bottles, tins, textile waste, cardboard, synthetics and cans. The TITECH autosort equipment uses infrared technology to "scan" and sort materials such as mixed plastics (PET, PP, PVC, and others), mixed paper, glass, C&D, and MSW materials. The equipment can sort materials by size, color, weight, and shape.

JRM and VAN DYK personnel collaborated on a layout of the plant's equipment that will accommodate future expansions and upgrades. CM&B's Project Manager, Marty Flannery, and Tom Gallo, the firm's on-site Project Superintendent, are overseeing construction of the new facility. CM&B also provided pre-construction planning, estimating services and value engineering for the project. Gallo pointed out that crews have been working at the Peabody site since the end of September 2013, when clearing and grubbing began.

### Precision Blasting Required

J. Masterson Construction Corp. of Danvers, Massachusetts, is doing the site work for the new MRF, under the supervision of Bill Peach, P.E. Masterson subcontracted blasting of the considerable amount of rock at the site to Maine Drilling and Blasting (MD&B) headquartered in Gardiner, Maine. A major challenge for the blasting crew was the presence of an elevated 500,000-gallon municipal water supply tank only yards from an area requiring rock removal.

Andy Dufore, Assistant Manager for MD&B's North Construction Division, described this particularly sensitive operation.

"The biggest challenge at the JRM site that we encountered while blasting approximately 37,000 cubic yards of granite was the close proximity of the water tower," Dufore said.

"Our work brought us within 44 feet of the tower, which required a specialized blast plan to make sure we were able to fracture the rock so it could be excavated while ensuring that we caused no damage to the water tower," he said.



Rendering provided by Architects H.L. Turner Group shows 50,000 square-foot GreenWorks recycling facility being built in Peabody for JRM Hauling & Recycling Services.



Excavator loads rock blasted out near municipal water tower onto a Volvo BM off-highway truck.

That blast plan called for the use of an electronic detonation system that utilizes a computer chip within each individual detonator to make sure the timing of the entire blast was precise, minimizing ground vibration. Dufore added that they used a packaged emulsion product and varied the quantity of explosives from as little as 35 pounds to a maximum of 650 pounds, while the depth of the deepest rock blasted was about 23 feet.

### Reusing Rock On-Site

About half of the rock blasted was exported from the site, while the remaining rock was crushed by mobile jaw and cone crushers and used for base material beneath access roads and parking areas. Cubellis pointed out that these areas will be paved with a 4 inch thick porous (open-graded) asphalt pavement, which is supported by a 20 inch deep subsurface recharge bed designed to withstand the loads of 18 wheel trucks while providing a way to manage storm water from the extensive large site.

This type of pavement allows water to drain through the asphalt surface into a stone recharge bed and infiltrate into the soils below the pavement. According to the National Asphalt Pavement Association,

porous asphalt pavements are not only attractive but have a service life of about 20 years, while promoting infiltration, improving water quality, and often eliminating the need for an on-site detention basin.

At GreenWorks, the engineered bed consists of a 4 inch choker course of single-sized crushed aggregate, 8 inches of bank-run gravel, 4 inches of pea gravel, and 4 inches of crushed stone base.

### A Heavy Duty Structure

As part of its site work, Masterson excavated the sizeable foundations of the MRF building. Resembling a trapezoid in plan, the MRF building is essentially a giant steel box measuring approximately 185 feet wide by 315 feet long, with a ceiling soaring about 60 feet above the 10 inch thick floor slab. A 2 foot thick concrete foundation wall circumscribes the building's footprint. The wall, which varies between 14 and 20 feet above the floor slab, was cast on an 8 foot wide, 18 inch deep concrete footing.

On top of the wall are steel columns consisting of hollow structural sections (HSS12x12x1/2) that support the metal roof structure. HSS shapes, also called tube steel or structural tubing, are in-



Tom Gallo is Project Superintendent for CM&B, the construction managers for new MRF building.

creasingly popular with designers of welded steel frames where columns might experience loading in multiple directions. Since they have uniform geometrics they have uniform strength characteristics along two or more cross-sectional axes, and provide excellent resistance to torsion. In this case, the columns are beefed up with C12x20.7 steel channels welded on two opposing sides.

All of this heavy duty concrete and steel sub-structure is necessary to support the gable roof structure – an enormous 3 inch 20 gage Type N metal surface. The roof rests on specially designed 8.5 to 12.5 foot deep, DLH Series, dual-pitch steel joists that span the distance between the bearing walls. These remarkably sized joists, spaced 7 feet on center, provide a 185 foot clear span for the 50,000 square feet of processing area far below. The ends of the joists are

seated on wide flange (W24x68) eave beams attached to the columns.

The siding of the building consists of opaque, 24 gage metal panels, with the top row of panels around the building comprised of translucent composite material to let natural daylight into the building. Another noteworthy feature of the MRF is a series of eight 20 foot high doors on the west side that allow easy passage of large trucks and processing equipment.

### Assembling and Start-Up

The technically advanced equipment is scheduled to start arriving at the job site in May, when the building shell is expected to be completed, according to Cubellis. VAN DYK will provide equipment assembling and start-up for the facility. GreenWorks is projected to be in operation by the end of this year. 🏗️



CM&B Assistant Project Manager Derek Harmon is flanked by TEREX/Cedar Rapids GRC380HLS rock crusher used to process blasted rock.

## Building Construction Team

In addition to those mentioned previously, the following firms and companies are instrumental to the construction of GreenWorks;

- Civil Engineering: Lynnfield Engineering Inc.:
- Fire Protection, Electrical Engineering: BLW Engineers
- Concrete Supplier: JG MacLellan
- Concrete Placement: Cabral Concrete Services
- Steel Supplier: Norgate
- Steel Erector: Champion Steel
- Metal Siding: Brookside Company Inc.
- Foundations: Ferreira Concrete Forms