



Public Works Department  
Road & Bridge  
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[www.volusia.org/publicworks/road.htm](http://www.volusia.org/publicworks/road.htm)

## STUDENT STEM SOLUTIONS PROJECT

### Project Information:

Pollutants in stormwater runoff are significant contributors to the nutrient impairment of surface waters throughout the State of Florida. Volusia County Road and Bridge has been tasked with installing a stormwater De-Nitrification Baffle Box on a pipe that discharges runoff from the surrounding roadways into the Halifax River. The purpose of the De-Nitrification Baffle Box is to remove debris, sediment and harmful nutrients from the stormwater prior to discharging into the Halifax River. Projects like these reduce the nutrient loading to ecologically sensitive water bodies and greatly increase the environmental health of our rivers and lakes.

The project location is at the intersection of Cardinal Blvd. & Marcelle Ave. in Port Orange. The baffle box will be installed in the grass area of 3882 Cardinal Blvd. just off the edge of pavement of Marcelle Ave. The project consists of excavating an area (20-feet long, 10-feet wide & 15 feet deep) for the baffle box to be installed. The baffle box will be delivered in three separate pieces (Base, Riser & Top Slab) on two tandem flat-bed trucks. The Base piece is the heaviest component (Approximately 34 tons) and will arrive on one truck by itself. The Riser and Top Slab will arrive together on the same truck. Both trucks will arrive at the same time about 9:00 am the day of the installation and will need to be staged on-site until they are unloaded. Once unloaded the trucks can leave the site.

A crane will be required to lift the baffle box components from the trucks into the excavated area. The Base component will be installed first, then the riser, then the top slab. Due to weight constraints, the crane can be no further than 150-feet from the excavated area or the structure it is lifting. Once the crane is setup, it cannot move, therefore it can only reach out a radius of 150-feet. The crane, once setup and ready to set the components, will require a road closure during the installation process that restricts traffic in both directions. A traffic detour will be required to route traffic around the crane during the road closure. The crane will arrive on-site about 8:00 am and will require 90 minutes to setup. There are no restrictions due to pole-mounted power lines at the job-site, therefore the only above ground obstacles will be the surrounding houses.

The trucks delivering the baffle box components will be staged on the roadway and cannot be parked on grass, sidewalks or driveways in order to minimize impacts to the public. However when staged on the road, the trucks will occupy one full lane of traffic, requiring that lane to be closed while they are waiting to be unloaded. Flagman can direct traffic around the trucks, however, due to the lane closure it is not recommended to stage the trucks on a street chosen for the crane detour.

Once the box components have been installed, the crane will demobilize and leave the job-site, the road can be re-opened and the detour removed.

**Student Tasks:**

1. Develop a plan for the location of the crane and the locations for staging the trucks with the baffle box components. Utilize Google Maps to measure distances and view existing site conditions. A location map of the project site is included below for reference. Dimensions (Length & Width) for the crane and tandem trucks are provided below.
2. Develop a detour route around the road closure for traffic that is traveling through the road closure. Local traffic, or people traveling to houses within road closure, will be let in by workers on-site and should be disregarded for the purposes of this detour. Detours should be designed to prevent cars from having to turn around, therefore road closures should occur at intersections to allow people to turn on to the detour route.
3. Develop a logistical plan and haul route for moving the trucks with the baffle box components within the project site during the installation process. Note that tandem trucks are difficult to drive in reverse on narrow residential streets such as Marcelle and Cardinal.

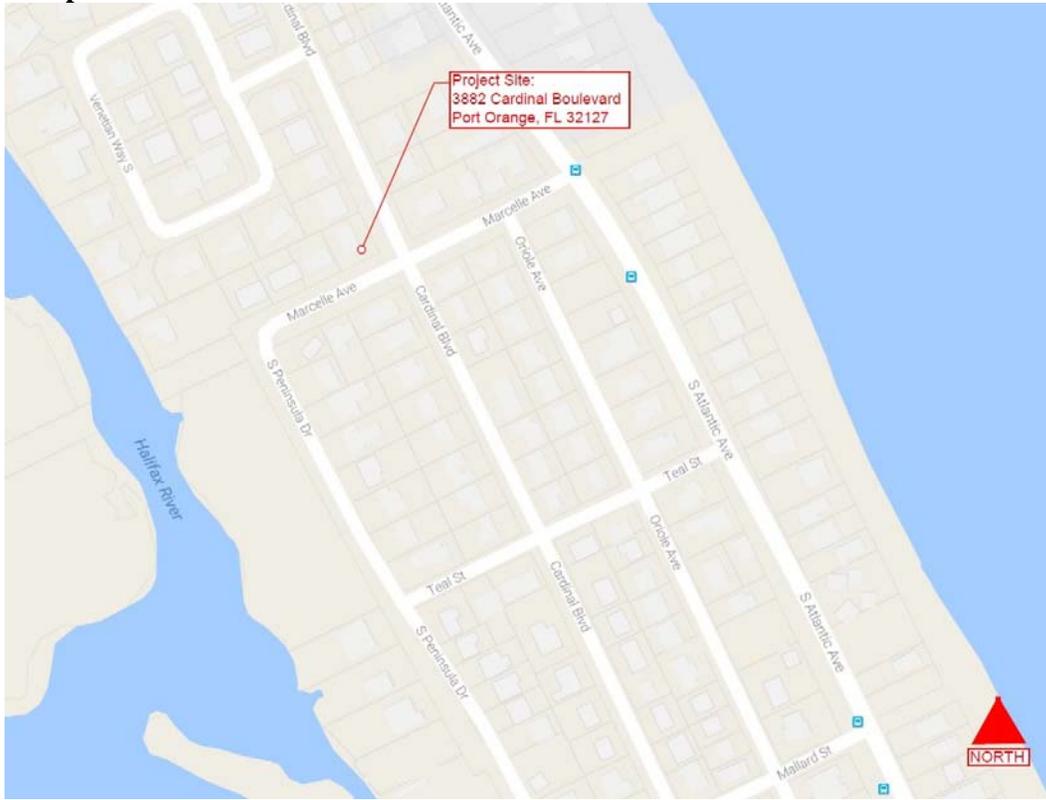
**Deliverables:**

1. Drawn site plan depicting the project site with the locations of the baffle box, crane, truck staging area and the locations where the crane will pick the baffle box off of the trucks.
2. Map of the area showing the detour route and location of the road closure.
3. Written logistical plan and a map of the proposed haul route.

**Contact Information:**

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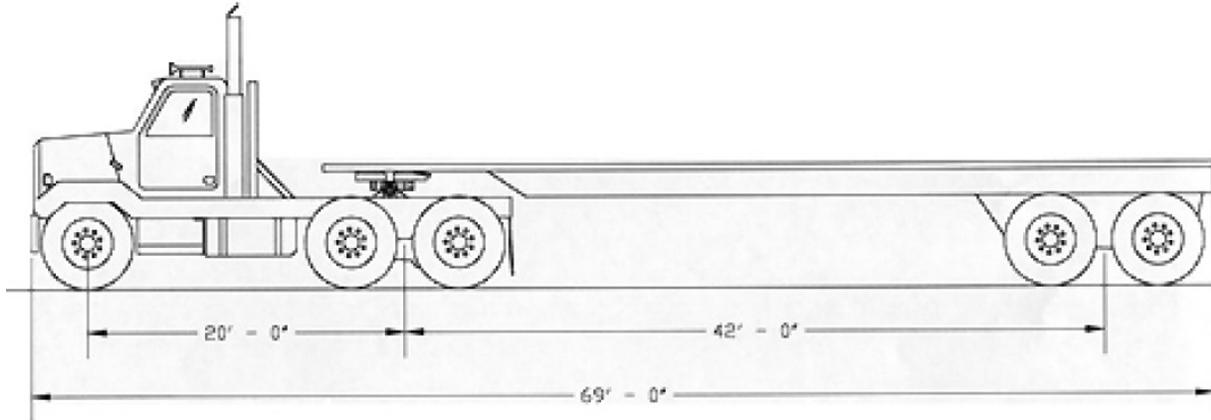
**Location Map:**



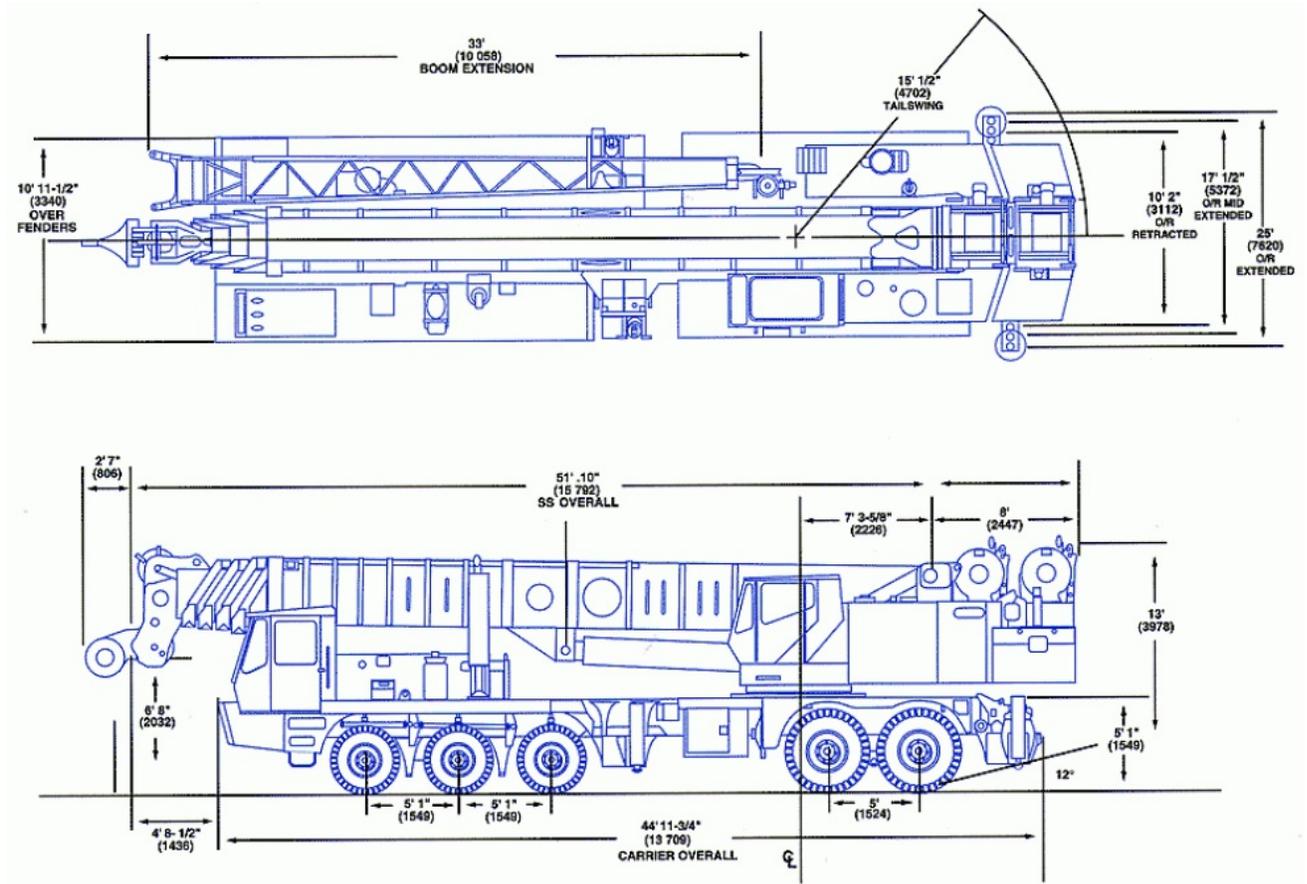
**Project Site and Baffle Box Location:**



**Truck Dimensions:**



**Crane Dimensions:**



**Baffle Box Installation Pictures:**

