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Date: September 14, 2015

Kaestle Boos Associates, Inc.
325 Foxborough Blvd.
Suite 100
Foxborough, MA 02035

Re: Middleborough Police Department
Wood Street
Middleborough, MA 02346
Structural Narrative

The purpose of this letter is to discuss the structural components of the proposed new buildings at the above mentioned project. This structural narrative is based upon the following documents.

Reference Drawings:

1. Main Level Floor Plan A1.01 Dated September 1, 2015.
2. Preliminary Site Plan L1.01.

The purpose for this new building is to serve as the new headquarters for the existing Middleborough Police Department. The new facilities will include three main structural building elements which are as follows: The main police headquarters building, detached vehicle carport roof canopy, & auxiliary vehicle maintenance outbuilding. The new construction materials and methods of construction for each building element is as follows:

I. Main Police Headquarters Building (16,835 sf area)

Foundations:

The new building will be comprised of perimeter concrete frost walls with interior spread footings. At this time there is no basement space thus the perimeter foundation walls will only need to go down to the minimum frost depth. The interior floor will consist of a 4" concrete slab on grade in the main building area and 6" thick slab on grade in the sally port area. The slab on grade in the sally port will be pitched to interior trench drains. In the Communications room 126 the concrete slab on grade will be depressed 1'-0" to allow access flooring to be installed in order to accommodate the extensive electrical and data cabling utilized in these rooms. The concrete for the walls, footings and slab on grade will be 3500 psi compressive strength concrete. The slab on grade will have a 15 mil poly vapor retarder and the concrete mix will contain the Barrier One moisture transmission retarding admixture. The concrete steel (rebar) reinforcing will be typical A615 or A706 grade 60 ksi material. The slab on grade shall contain 6x6 W2.0/W2.0 welded wire fabric reinforcing.

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For all three new buildings at this time it is assumed that the existing soil subgrade is suitable for traditional spread footings, i.e. no deep foundations piles or other special soil improvements. A typical slab on grade and footing preparation would be 4"-6" of 3/8" crushed stone on top of proof rolled virgin subgrade. Once the geotechnical report has been completed the foundation systems might have to be revisited to reflect the recommendations that are to be set forth by the geotechnical engineer.

Roof Structure:

The roof will be a pitched style roof arrangement that will be created by using light gage metal pitched top chord roof trusses that are supported on wide flange steel beams or concrete masonry bearing walls. In some of the taller truss space areas there could be the need for attic style roof trusses to create an attic service walkway to allow for the servicing of any mechanical units or filters that will be installed above the ceiling in the open truss space. The steel beams will be supported on steel columns down to the concrete foundations at grade. The roof diaphragm will be comprised of 1 ½" deep – 20 gage wide rib type B roof decking that will be screwed to the light gage roof trusses. Insulation and roofing finish system as called out by the architect will cover the roof decking to create a weather tight assembly.

Steel Framing / Wind and Seismic Lateral System:

The structural steel will be comprised of HSS tube steel columns with wide flange steel girder and infill beams. The lateral system will most likely consist of moment frames to create rigidity in the building framework.

The steel materials used shall be as follows:

HSS Tube Sections ASTM A500 Grade B Fy=46 ksi
Plates, Angles, Channels, Solid and Flat Bars ASTM A36 Fy=36 ksi,
Wide Flange Beams ASTM A992 Gr 50 ksi
Anchor Rods ASTM F1554 Gr 55 ksi

All structural steel to be shop primed painted. Any exterior exposed angle, beam or plate lintels to be hot dip galvanized.

Masonry Bearing Wall System:

In the Sally Port and Detention areas the new walls will consist of 8" concrete masonry bearing walls. These bearing walls will be used to support the roof framing. For preliminary estimating purposes the exterior bearing walls will be constructed with 8" concrete masonry block that will be reinforced with #5 vertical reinforcing at 24" o.c. and horizontal bond beams at 48" o.c. vertical spacing that are reinforced with (2)-#5's. The masonry assembly shall have an f'm of 2000 psi. The grout shall be a

1755 Meriden Waterbury Turnpike Unit 6 P.O. Box 365
Milldale, Connecticut, 06467
Tel. 860-863-9978 Fax 860-426-3174

minimum of 2500 psi compressive strength. It should be noted that all the detention cell masonry walls bearing or not will require all the masonry cells to be grouted solid.

II. Exterior Vehicle Carport Canopy (20' wide x 74' long)

Foundations:

The new carport canopy will be supported on spread footings that are down to a minimum frost depth with concrete piers that will be approximately 1'-0" above grade to support the upper structure steel canopy columns. The concrete for the footings and piers will be 3500 psi compressive strength concrete. The concrete steel (rebar) reinforcing will be typical A615 or A706 grade 60 ksi material.

Roof Structure:

The roof will have a slight pitch sufficient to pitch water to interior drains. The roof will be structured with wide flange steel beams with two rows of steel columns that are supported on concrete piers at the grade level. The roof diaphragm will be comprised of 1 ½" deep – 20 gage wide rib type B roof decking that will be welded to the wide flange steel beams. Roofing finish system as called out by the architect will cover the roof decking to create a weather tight assembly.

Steel Framing / Wind and Seismic Lateral System:

The structural steel will be comprised of HSS tube steel columns with wide flange steel girder and infill beams. The lateral system will most likely consist of moment frames to create rigidity in the building framework.

The steel materials used shall be as follows:

HSS Tube Sections ASTM A500 Grade B Fy=46 ksi
Plates, Angles, Channels, Solid and Flat Bars ASTM A36 Fy=36 ksi,
Wide Flange Beams ASTM A992 Gr 50 ksi
Anchor Rods ASTM F1554 Gr 55 ksi

All structural steel to be shop primed painted and finish painted or clad as directed by the architect.

III. Auxiliary Vehicle Maintenance Outbuilding (2,418 sf area)

Foundations:

The new auxiliary vehicle maintenance outbuilding will be supported on spread footings that are down to a minimum frost depth with concrete piers that will support the steel upper structure rigid frame columns. The interior floor will consist of a 6" concrete slab on grade that is pitched to interior trench drains in the vehicle bays. At each rigid frame there will be a concrete encased under slab

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reinforced tie beam that will connect each rigid frame concrete pier together. The concrete for the walls, footings and slab on grade will be 3500 psi compressive strength concrete. The slab on grade will have a 15 mil poly vapor retarder and the concrete mix will contain the Barrier One moisture transmission retarding admixture. The concrete steel (rebar) reinforcing will be typical A615 or A706 grade 60 ksi material. The slab on grade shall contain 6x6 W2.0/W2.0 welded wire fabric reinforcing.

Upper Mezzanine Storage Floor Area:

The upper floor area will most likely consist of either light gage metal or wood floor joists that are supported on wood or light gage bearing walls down to the slab on grade elevation. Additional structure will be required in order to properly support a davit crane that will be located on the mezzanine upper level. This upper floor area will most likely be sized to support a light storage live loading of 125 psf.

Roof Structure:

The roof and walls of this building will be comprised of a pre-engineered metal building rigid frames, steel roof and wall purlins with metal siding and roofing.

Steel Framing / Wind and Seismic Lateral System:

The pre-engineered metal building structural steel will most likely be comprised of built-up metal plate girders and steel Z wall and roof purlins. Given that the pre-engineered metal building is a proprietary design system, each manufacture will have slightly different methods to support the imposed loading. The most common method to create lateral wind and seismic stability in a pre-engineered metal building system will most likely consist of steel cable X bracing in certain column bays of the building which will provide rigidity in the pre-engineered metal building framework. Preliminary foundation loads will be estimated for the construction document phase. Once the pre-engineered metal building supplier is selected the supplier will provide the final imposed foundation loads and reaction on the concrete foundation system. These loads will be used to review the foundation system in the construction documents. Minor adjustments to the contract drawing foundations might be required based upon the actual pre-engineered metal building reactions.

Should the proposed scope of the project change the above structural narrative should be adjusted to reflect these modifications. If you have any further questions regarding this please give me a call.

Sincerely,

David J. Toce PE, SECB

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