CONSULTANT NARRATIVES

STRUCTURAL ASSESSMENT

APPX. A - e

MODULE 3: PREFERRED SCHEMATIC DESIGN

SECTION TITLE

1. STRUCTURE

OPTION B2 – RENOVATION / ADDITION OF EXISTING HIGH SCHOOL

Structural: Designed in accordance with the 9th Edition of The Massachusetts State Building Code and incorporating IBC 2015 with Massachusetts amendments.

The proposed scheme requires renovation of the entire original school with very limited selective demolition of the existing structure. The scheme requires construction of four additions which include two single story additions to increase the size of the existing Automotive, Carpentry and Electrical shops, a single story addition to increase the size of the existing cafeteria and a four story addition that will house the Administration Department, Guidance, Early Education, Culinary Arts, classrooms and Science Labs to the High School. The renovations will require reconfiguration of numerous spaces and programs. The renovation scope also includes infilling the pool and converting the space to be used as an Auditorium. The project will be phased over several years to allow for portions of the existing school in use till the Additions are constructed and students can be relocated. The scheme requires construction of a two level parking garage structure. The scheme also requires construction of a standalone two story Concession Building and a single story pre-engineered steel framed Maintenance Garage Building.

Specific dimensions are as follows (not including the Parking structure, Concession Building and the Maintenance Garage):

- Additions (85,000 to 135,000 GSF Total)
- Renovation (240,000 GSF Total)
- Total Area (325,000 to 375,000 GSF Total)

Primary Structural Code Issues Related To The Existing Structure

Due to the extent of the proposed renovations and additions to the existing structure, the existing structure will have to be upgraded by the addition of some masonry shear walls. All of the existing masonry walls will be required to be clipped to the floor or roof structure.

PROPOSED STRUCTURAL SCHEME

Due to the extent of the proposed renovations and reconfiguration of the interior spaces, additional reinforced masonry shear walls or braced frames of structural steel will be required. The proposed shear walls or braced frames would be located at the existing column lines. An allowance for 30, 25 ft. long, full height shear walls should be made in the project budget for the both the original High School. These new shear walls will be supported on new 2 ft. – 0 in. wide x 1 ft. – 0 in. deep reinforced concrete foundations.

Allow for replacement of 5 ft. – 0 in. width of existing slab-on-grade along the length of the proposed shear wall.

The existing pool will be infilled with Geofoam (https://www.geofoam.com/), lightweight fill material that is essentially like blocks of insulation to reduce the lateral pressures on sides of the existing pool walls and a new 5" thick concrete slab on grade reinforced with WWF, 6x6, W2.1xW2.1 would be constructed on top of the geofoam fill. Auditorium risers would be concrete structures on grade above the slab on grade.

Demolishing the concrete bleachers would be trickier as the bleacher structure braces the top of the concrete wall at the interface with the masonry wall. We propose constructing 12" thick reinforced concrete slab spanning between the exterior concrete slab and the interior tunnel wall (basement wall) at the deck level reinforced with #5 @12" on center each way, top and bottom. In addition allow for HSS 12x12 structural steel girts or cast in place concrete beams spanning along length of the wall at the interface of the existing concrete wall and the masonry wall at top of the existing bleacher structure.

Due to the replacement of the entire mechanical and HVAC system, an allowance should be made for reinforcement of the existing roof framing to support the new units. This cost should be carried as a percentage cost of the mechanical units in the budget.

All of the existing masonry walls will be required to be clipped to the existing structure with steel angle clips at 4 ft. – 0 in. on center.

PROPOSED ADDITIONS

SUBSTRUCTURE

Foundations

Based on the foundations of the existing school structure and assumptions of the soil conditions on the proposed site, the columns of the proposed structure would bear on reinforced concrete spread footings and the perimeter foundation walls would bear on continuous reinforced concrete strip footings extending at least 4 ft. – 0 in. below grade. With the assumed bearing capacity of the soil of 2 tons/sf, a typical interior footing would be 11 ft. - 0 in. x 11 ft. - 0 in. x 24 in. deep and a typical exterior footing would be 10 ft. – 0 in. x 10 ft. 0 in. x 24 in. in the four story addition. Typical interior and exterior footings at the single story Additions would be 8 ft. – 0 in. x 8 ft. – 0 in. x 24 in. deep. Typical interior and exterior footings at the Standalone Concession Building would be 6 ft. – 0 in. x 6 ft. – 0 in. x 24 in. deep. The exterior foundation walls would be 14 to 16 in. thick, reinforced cast-in-place concrete walls on 24 to 36 in. wide x 12 in. deep continuous reinforced concrete strip footings around the perimeter of the additions extending a minimum of 4 ft. - 0 in. below finished grade. The retaining walls at the Concession building below grade would be 2 ft. - 0 in. thick reinforced concrete walls supported on 9 ft. - 0 in. wide by 2 ft. – 0 in. thick continuous reinforced concrete footings. Foundation drains will be installed around foundations of all structures below grade. Foundations will be founded on 12in. of compacted sand gravel fill or 6" of crushed stone placed above compacted structural granular fill in wet

conditions. The typical column footings for the garage columns would be 10 ft. – 0 in. x 10 ft. 0 in. x 30 in. deep.

Slabs-on-Grade

Based on the existing school construction, the lowest level of the proposed additions would be a 5 in. thick concrete slab-on-grade reinforced with welded wire fabric over a vapor barrier on 2 in. thick rigid insulation on 8 in. of compacted granular structural fill and a base course of 8 in. of compacted gravel.

SUPERSTRUCTURE

Floor Construction

Typical Floor Construction
A 5 1/4 in. light weight concrete composite metal deck slab reinforced with welded wire fabric on wide flange steel beams spanning between steel girders and columns. The weight of the structural steel is estimated to be 14 psf for the typical framing (this includes the scope for the Concession Building).

Roof Construction

Typical Roof Construction
The roof construction would be galvanized, corrugated 3 in. deep, Type 'N' metal roof deck spanning between wide flange steel beams and girders connected to the existing steel beams. The weight of the structural steel is estimated to be 14 psf (this includes the scope for the roof of the Concession Building).

Vertical Framing Elements

Columns
Columns will be hollow structural steel columns. Typical columns would be HSS 8 x 8 columns and the columns at the double height spaces would be HSS 12 x 12.

Lateral Load-Resisting System
The typical lateral load resisting system for the school would be ordinary concentric braced frames comprised of HSS structural steel members. The lateral loads of the garage structure would be resisted by precast concrete shear walls.

Expansion Joints

The proposed four story addition will be divided in to two parts separated by way of an expansion joint and would be separated from the existing building.

The single story additions would be structurally connected to the existing building.

Pre-Engineered Superstructure for Maintenance Garage

The pre-engineered superstructure would be a steel framed structure supported on reinforced concrete spread footings and the perimeter foundation walls would bear on continuous reinforced concrete strip footings extending at least 4 ft. – 0 in. below grade. The interior and exterior foundations supporting the columns of the single story, pre-engineered steel structure would be 5 ft. – 0 in. x 5 ft. – 0 in. x 2 ft. – 0 in. deep. The structure would be comprised of steel bents with tapered columns and beams. The roof deck would be a composite deck spanning between steel 'Z' shaped purlins. The lateral loads would be resisted by ordinary steel moment frames and ordinary concentric braced frames. The slab would be the typical 6 in. thick concrete slab-on-grade reinforced with welded wire fabric over a vapor barrier on 2 in. thick rigid insulation on 12in. of compacted sand gravel structural fill.

Garage Construction

The supported garage level will be framed with 2'-10" deep x 12'-0" wide prestressed precast concrete double tees spanning sixty feet between 7'-0" deep exterior precast concrete spandrels spanning 36 feet and interior inverted tee precast concrete beams. The beams and the spandrels would be supported on precast concrete columns.

MODULE 3: PREFERRED SCHEMATIC DESIGN

SECTION TITLE

1. STRUCTURE

OPTIONS C.1 – NEW CONSTRUCTION

Structural: Designed in accordance with the 9th Edition of The Massachusetts State Building Code and incorporating IBC 2015 with Massachusetts amendments.

The proposed scheme will consist of construction of the new school that would include a new, 5-story Academic Wing, Auditorium, Gymnasium, etc. located north of the existing High School; a standalone two story Concession Building and a single story pre-engineered steel framed Maintenance Garage Building.

SUBSTRUCTURE

Foundations

Based on the foundations of the existing school structure and assumptions of the soil conditions on the proposed site, the columns of the proposed structure would bear on reinforced concrete spread footings and the perimeter foundation walls would bear on continuous reinforced concrete strip footings extending at least 4 ft. – 0 in. below grade. The walls around the spaces below grade will be cantilevered retaining buttressed walls supported on reinforced concrete footings. With the assumed bearing capacity of the soil of 2 tons/sf, a typical interior footing at the academic wing would be 13 ft. – 0 in. x 13 ft. - 0 in. x 24 in. deep and the typical exterior footings would be 12 ft. – 0 in. x 12 ft. – 0 in. x 24 in. deep in the five story areas. In the two story areas of the vocational shops, typical interior footings would be 11 ft. – 0 in. x 11 ft. – in. x 24 in. deep and typical exterior footings would be 10 ft. – 0 in. x 10 ft. - 0 in. x 24 in. deep. Typical interior and exterior footings at the Metal Fabrication shop / Gymnasium would be 13 ft. – 0 in. x 13 ft. – 0 in. x 24 in. deep. Typical interior and exterior footings at the Auditorium would be 12 ft. – 0 in. x 12 ft. – 0 in. x 24 in. deep. Typical interior and exterior footings at the Standalone Concession Building would be 6 ft. – 0 in. x 6 ft. – 0 in. x 24 in. deep. The exterior foundation walls would be 14 to 16 in. thick, reinforced cast-in-place concrete walls on 24 to 36 in. wide continuous reinforced concrete strip footings around the perimeter of the building extending a minimum of 4 ft. – 0 in. below finished grade. The retaining walls at the Concession Building below grade would be 2 ft. - 0 in. thick reinforced concrete walls supported on 9 ft. - 0 in. wide by 2 ft. – 0 in. thick continuous reinforced concrete footings. The retaining walls at portions of the building 30 to 35 feet below grade would be 2 ft.-6 in. thick reinforced concrete walls supported on 14 ft.-0 in. wide x 2 ft.-0 in. thick continuous reinforced concrete footings with 12 in. thick reinforced concrete full height buttress walls. The heel of the footing would be 10’-0” wide and located towards the existing buildings. The buttress walls will be a minimum 12 ft.–0 in. long and spaced approximately 20 ft.-0 in. on center. The buttress walls would be located either in the interior space or on the back side of the retaining wall

depending on the location of the walls in the program spaces. Foundation drains will be installed around foundations of all structures below grade. Foundations will be founded on 12in. of compacted sand gravel fill or 6" of crushed stone placed above compacted structural granular fill in wet conditions.

Slabs-on-Grade

Based on the existing school construction, the typical lowest level of the proposed structure would be a 5 in. thick concrete slab-on-grade reinforced with welded wire fabric over a vapor barrier on 2 in. thick rigid insulation on 12in. of compacted sand gravel structural fill. The slab on grade will be 6" thick in the shop areas.

SUPERSTRUCTURE

Floor Construction

Typical Floor Construction
A 5 1/4 in. light weight concrete composite metal deck slab reinforced with welded wire fabric on wide flange steel beams spanning between steel girders and columns. The weight of the structural steel is estimated to be 15 psf for the typical framing (this includes the scope for the Concession Building). The weight of structural steel at the second floor above the Automotive shop is estimated to be 22 psf (proposed span above this space is 80 feet) and weight of steel at second floor above the other shops is estimated to be 20 psf (maximum span above this space is 53 feet). Note the floor above the second floor would be the typical floor construction.

Roof Construction

Typical Roof Construction
The roof construction would be galvanized, corrugated 3 in. deep, Type 'N' metal roof deck spanning between wide flange steel beams and girders. At locations of roof supported mechanical equipment, a concrete slab will be provided similar to the typical supported slab. The weight of the structural steel is estimated to be 14 psf (this includes the scope for the roof of the Concession Building).

Low Roof Structure
The portion of the low roof in front of the Media Center would serve as the patio and the vegetated roof would be a continuation of the adjacent floor and would be similar to the typical floor construction of 5 1/4 in. light weight concrete composite metal deck slab reinforced with welded wire fabric on wide flange steel beams spanning between steel girders and columns. The remainder of the low roof in front of the classrooms would be typical roof construction. The mechanical units located on this roof would be screened by a screen comprised of structural steel posts and beams. The weight of the structural steel for the patio, the vegetated green roof and portions of roof supporting mechanical equipment is estimated to be 18 psf. The weight of the structural steel of the portion of the roof that is typical roof construction is estimated to be 14 psf.

Gymnasium and Auditorium Roof Framing
The roof construction would be acoustic, galvanized, corrugated 3 in. deep, Type 'NA" metal roof deck at the Gymnasium and the Cafeteria, spanning between long span steel joists. The weight of the steel joists and structural steel framing is estimated to be 13 psf.

Vertical Framing Elements

Columns
Columns will be hollow structural steel columns. Typical columns would be HSS 12 x 12 and HSS 14x14 and the columns at the double height spaces would be HSS 12 x 12.

Lateral Load-Resisting System
The typical lateral load resisting system for the school would be ordinary concentric braced frames comprised of HSS structural steel members.

Expansion Joints

The proposed school will be divided in to three parts separated by way of two expansion joints.

Pre-Engineered Superstructure for Maintenance Garage

The pre-engineered superstructure would be a steel framed structure supported on reinforced concrete spread footings and the perimeter foundation walls would bear on continuous reinforced concrete strip footings extending at least 4 ft. – 0 in. below grade. The interior and exterior foundations supporting the columns of the single story, pre-engineered steel structure would be 5 ft. – 0 in. x 5 ft. – 0 in. x 2 ft. – 0 in. deep. The structure would be comprised of steel bents with tapered columns and beams. The roof deck would be a composite deck spanning between steel 'Z' shaped purlins. The lateral loads would be resisted by ordinary steel moment frames and ordinary concentric braced frames. The slab would be the typical 6 in. thick concrete slab-on-grade reinforced with welded wire fabric over a vapor barrier on 2 in. thick rigid insulation on 12in. of compacted sand gravel structural fill.

MODULE 3: PREFERRED SCHEMATIC DESIGN

SECTION TITLE

1. STRUCTURE

OPTIONS C.2 – NEW CONSTRUCTION

Structural: Designed in accordance with the 9th Edition of The Massachusetts State Building Code and incorporating IBC 2015 with Massachusetts amendments.

The proposed scheme will consist of construction of the new school that would include a new, 4-story Academic Wing, Auditorium, Gymnasium, etc. located west of the existing High School; a standalone two story Concession Building and a single story pre-engineered steel framed Maintenance Garage Building.

SUBSTRUCTURE

Foundations

Based on the foundations of the existing school structure and assumptions of the soil conditions on the proposed site, the columns of the proposed structure would bear on reinforced concrete spread footings and the perimeter foundation walls would bear on continuous reinforced concrete strip footings extending at least 4 ft. – 0 in. below grade. The walls around the spaces below grade will be cantilevered retaining buttressed walls supported on reinforced concrete footings. With the assumed bearing capacity of the soil of 2 tons/sf, a typical interior footing at the academic wing would be 12 ft. – 0 in. x 12 ft. - 0 in. x 24 in. deep and the typical exterior footings would be 11 ft. – 0 in. x 11 ft. – 0 in. x 24 in. deep in the four story areas. In the single story areas of the vocational shops, typical interior footings would be 10 ft. – 0 in. x 10 ft. – in. x 24 in. deep and typical exterior footings would be 9 ft. – 0 in. x 9 ft. - 0 in. x 24 in. deep. Typical interior and exterior footings at the Gymnasium would be 13 ft. – 0 in. x 13 ft. – 0 in. x 24 in. deep. Typical interior and exterior footings at the Auditorium would be 12 ft. – 0 in. x 12 ft. – 0 in. x 24 in. deep. Typical interior and exterior footings at the Standalone Concession Building would be 6 ft. – 0 in. x 6 ft. – 0 in. x 24 in. deep. The exterior foundation walls would be 14 to 16 in. thick, reinforced cast-in-place concrete walls on 24 to 36 in. wide continuous reinforced concrete strip footings around the perimeter of the building extending a minimum of 4 ft. – 0 in. below finished grade. The retaining walls at the Concession building below grade would be 2 ft. - 0 in. thick reinforced concrete walls supported on 9 ft. - 0 in. wide by 2 ft. – 0 in. thick continuous reinforced concrete footings. The retaining walls at portions of the building 30 to 35 feet below grade would be 2 ft.-6 in. thick reinforced concrete walls supported on 14 ft.-0 in. wide x 2 ft.-0 in. thick continuous reinforced concrete footings with 12 in. thick reinforced concrete full height buttress walls. The heel of the footing would be 10'-0" wide and located towards the existing buildings. The buttress walls will be a minimum 12 ft.–0 in. long and spaced approximately 20 ft.-0 in. on center. The buttress walls would be located either in the interior space or on the back side of the retaining wall depending on the location of the

walls in the program spaces. Foundation drains will be installed around foundations of all structures below grade. Foundations will be founded on 12in. of compacted sand gravel fill or 6" of crushed stone placed above compacted structural granular fill in wet conditions.

Slabs-on-Grade

Based on the existing school construction, the typical lowest level of the proposed structure would be a 5 in. thick concrete slab-on-grade reinforced with welded wire fabric over a vapor barrier on 2 in. thick rigid insulation on 12in. of compacted sand gravel structural fill. The slab on grade will be 6" thick in the shop areas.

SUPERSTRUCTURE

Floor Construction

Typical Floor Construction
A 5 1/4 in. light weight concrete composite metal deck slab reinforced with welded wire fabric on wide flange steel beams spanning between steel girders and columns. The weight of the structural steel is estimated to be 15 psf for the typical framing (this includes the scope for the Concession Building). The weight of structural steel at the second floor above the Automotive shop is estimated to be 22 psf (proposed span above this space is 80 feet) and weight of steel at second floor above the other shops is estimated to be 20 psf (maximum span above this space is 53 feet). Note the floor above the second floor would be the typical floor construction.

Roof Construction

Typical Roof Construction
The roof construction would be galvanized, corrugated 3 in. deep, Type 'N' metal roof deck spanning between wide flange steel beams and girders. At locations of roof supported mechanical equipment, a concrete slab will be provided similar to the typical supported slab. The weight of the structural steel is estimated to be 14 psf (this includes the scope for the roof of the Concession Building).

Gymnasium and Auditorium Roof Framing
The roof construction would be acoustic, galvanized, corrugated 3 in. deep, Type 'NA" metal roof deck at the Gymnasium and the Cafeteria, spanning between long span steel joists. The weight of the steel joists and structural steel framing is estimated to be 13 psf.

Vertical Framing Elements

Columns
Columns will be hollow structural steel columns. Typical columns would be HSS 12 x 12 and HSS 14x14 and the columns at the double height spaces would be HSS 12 x 12.

Lateral Load-Resisting System
The typical lateral load resisting system for the school would be ordinary concentric braced frames comprised of HSS structural steel members.

Expansion Joints

The proposed school will be divided in to three parts separated by way of two expansion joints.

Pre-Engineered Superstructure for Maintenance Garage

The pre-engineered superstructure would be a steel framed structure supported on reinforced concrete spread footings and the perimeter foundation walls would bear on continuous reinforced concrete strip footings extending at least 4 ft. – 0 in. below grade. The interior and exterior foundations supporting the columns of the single story, pre-engineered steel structure would be 5 ft. – 0 in. x 5 ft. – 0 in. x 2 ft. – 0 in. deep. The structure would be comprised of steel bents with tapered columns and beams. The roof deck would be a composite deck spanning between steel 'Z' shaped purlins. The lateral loads would be resisted by ordinary steel moment frames and ordinary concentric braced frames. The slab would be the typical 6 in. thick concrete slab-on-grade reinforced with welded wire fabric over a vapor barrier on 2 in. thick rigid insulation on 12in. of compacted sand gravel structural fill.

MODULE 3: PREFERRED SCHEMATIC DESIGN

SECTION TITLE

1. STRUCTURE

OPTIONS C.3 – NEW CONSTRUCTION

Structural: Designed in accordance with the 9th Edition of The Massachusetts State Building Code and incorporating IBC 2015 with Massachusetts amendments.

The proposed scheme will consist of construction of the new school that would include a new, 3-story Academic Wing, Auditorium, Gymnasium, etc. located south of the existing High School; a standalone two story Concession Building and a single story pre-engineered steel framed Maintenance Garage Building.

SUBSTRUCTURE

Foundations

Based on the foundations of the existing school structure and assumptions of the soil conditions on the proposed site, the columns of the proposed structure would bear on reinforced concrete spread footings and the perimeter foundation walls would bear on continuous reinforced concrete strip footings extending at least 4 ft. – 0 in. below grade. With the assumed bearing capacity of the soil of 2 tons/sf, a typical interior footing would be 11 ft. – 0 in. x 11 ft. - 0 in. x 24 in. deep and the typical exterior footings would be 10 ft. – 0 in. x 10 ft. – 0 in. x 24 in. deep in the three story areas. In the two story areas, typical interior footings would be 10 ft. – 0 in. x 10 ft. – in. x 24 in. deep and typical exterior footings would be 9 ft. – 0 in. x 9 ft. - 0 in. x 24 in. deep. Typical interior and exterior footings at the Gymnasium would be 8 ft. – 0 in. x 8 ft. – 0 in. x 24 in. deep. Typical interior and exterior footings at the Auditorium would be 12 ft. – 0 in. x 12 ft. – 0 in. x 24 in. deep. Typical interior and exterior footings at the Standalone Concession Building would be 6 ft. – 0 in. x 6 ft. – 0 in. x 24 in. deep. The exterior foundation walls would be 14 to 16 in. thick, reinforced cast-in-place concrete walls on 24 to 36 in. wide continuous reinforced concrete strip footings around the perimeter of the building extending a minimum of 4 ft. – 0 in. below finished grade. The retaining walls at portions of the building below grade and at the Concession building would be 2 ft. - 0 in. thick reinforced concrete walls supported on 9

ft. - 0 in. wide by 2 ft. – 0 in. thick continuous reinforced concrete footings. Foundation drains will be installed at all foundations below grade.

Foundations will be founded on 12in. of compacted sand gravel fill or 6" of crushed stone placed above compacted structural granular fill in wet conditions.

Slabs-on-Grade

Based on the existing school construction, the typical lowest level of the proposed structure would be a 5 in. thick concrete slab-on-grade reinforced with welded wire fabric over a vapor barrier on 2 in. thick rigid insulation on 12in. of compacted sand gravel structural fill. The slab on grade will be 6" thick in the shop areas.

SUPERSTRUCTURE

Floor Construction

Typical Floor Construction
A 5 1/4 in. light weight concrete composite metal deck slab reinforced with welded wire fabric on wide flange steel beams spanning between steel girders and columns. The weight of the structural steel is estimated to be 15 psf for the typical framing (this includes the scope for the Concession Building). The weight of structural steel at the second floor above the Automotive shop is estimated to be 22 psf (proposed span above this space is 80 feet) and weight of steel at second floor above the other shops is estimated to be 20 psf (maximum span above this space is 53 feet). Note the floor above the second floor would be the typical floor construction.

Roof Construction

Typical Roof Construction
The roof construction would be galvanized, corrugated 3 in. deep, Type 'N' metal roof deck spanning between wide flange steel beams and girders. At locations of roof supported mechanical equipment, a concrete slab will be provided similar to the typical supported slab. The weight of the structural steel is estimated to be 14 psf (this includes the scope for the roof of the Concession Building).

Low Roof Structure
The low roof in front of the Media Center would serve as the patio and the vegetated roof would be a continuation of the adjacent floor and would be similar to the typical floor construction of 5 1/4 in. light weight concrete composite metal deck slab reinforced with welded wire fabric on wide flange steel beams spanning between steel girders and columns. The mechanical units located on this roof would be screened by a screen comprised of structural steel posts and beams. The weight of the structural steel is estimated to be 18 psf.

Gymnasium and Auditorium Roof Framing
The roof construction would be acoustic, galvanized, corrugated 3 in. deep, Type 'NA" metal roof deck at the Gymnasium and the Cafeteria, spanning between long span steel joists. The weight of the steel joists and structural steel framing is estimated to be 13 psf.

Vertical Framing Elements

Columns
Columns will be hollow structural steel columns. Typical columns would be HSS 12 x 12 and HSS 14x14 and the columns at the double height spaces would be HSS 12 x 12.

Lateral Load-Resisting System
The typical lateral load resisting system for the school would be ordinary concentric braced frames comprised of HSS structural steel members.

Expansion Joints

The proposed school will be divided in to three parts separated by way of two expansion joints.

Pre-Engineered Superstructure for Maintenance Garage

The pre-engineered superstructure would be a steel framed structure supported on reinforced concrete spread footings and the perimeter foundation walls would bear on continuous reinforced concrete strip footings extending at least 4 ft. – 0 in. below grade. The interior and exterior foundations supporting the columns of the single story, pre-engineered steel structure would be 5 ft. – 0 in. x 5 ft. – 0 in. x 2 ft. – 0 in. deep. The structure would be comprised of steel bents with tapered columns and beams. The roof deck would be a composite deck spanning between steel 'Z' shaped purlins. The lateral loads would be resisted by ordinary steel moment frames and ordinary concentric braced frames. The slab would be the typical 6 in. thick concrete slab-on-grade reinforced with welded wire fabric over a vapor barrier on 2 in. thick rigid insulation on 12in. of compacted sand gravel structural fill.