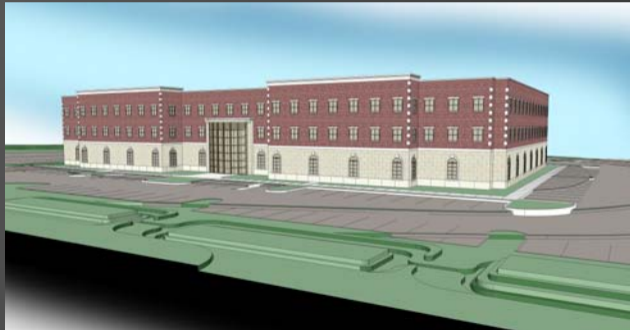


Crocker West Building

State College, Pa



Eric M. Foster

Spring 2009

Structural Option

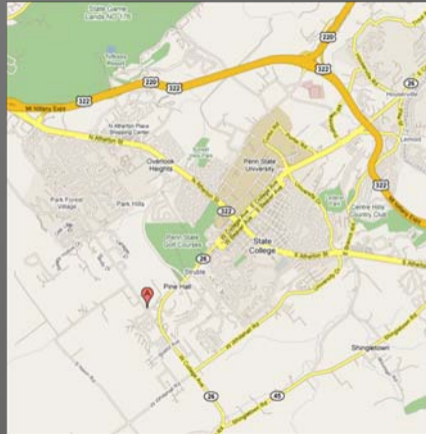
Outline

- *Overview of Existing*
- Proposal
- Structural Depth Study
- Architectural Breadth Study
- Construction Management Breadth Study
- Summary/ Conclusions
- Acknowledgements
- ???

Overview of Existing

➤ Location

- 224 Science Park Road
State College, Pa



Overview of Existing



➤ Location

- 224 Science Park Road
State College, Pa
- Just off SR 26 in Ferguson Township

Overview of Existing



- Location
- Use

- 40,000 s.f. Light Industrial
- 70,000 s.f. Office
- 10,000 s.f. Warehouse Storage

Overview of Existing



- Location
- Use
- Zoning
 - Light Industry, R & D

Overview of Existing

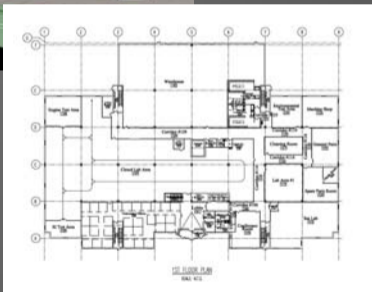


- Location
- Use
- Zoning
- Owners
 - C2S, LLP. (Scott Smith & Mike Coyle)



Overview of Existing

- Location
- Use
- Zoning
- Owners
- Size

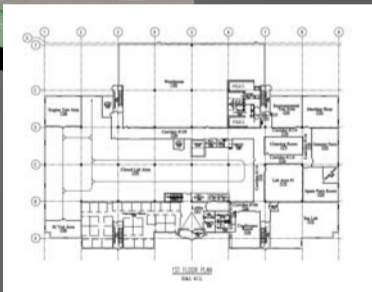


- 3-Story Low-Rise Building (45 ft)
- 121,000 s.f.



Overview of Existing

- Location
- Use
- Zoning
- Owners
- Size
- Cost
 - Approximately \$18 Million



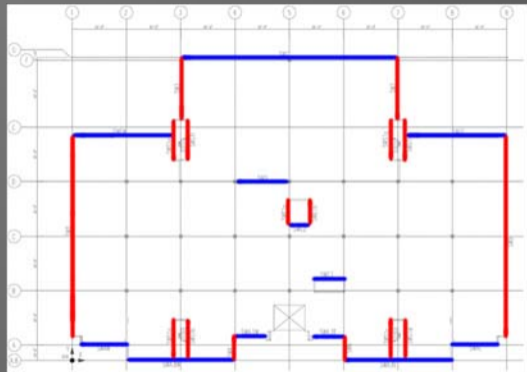
Overview of Existing



➤ Architectural Precast Concrete (APC)

- Columns (24 in square columns)
- Wall Panels (9 ½" & 12 ½" Thk. Insulated Panels)
 - Brick In-lay Finish
- Inverted Tee (IT) Beams (18"-28" Deep)
- 4 ft wide Hollow-Core Plank (8"-12" Thk.)

Overview of Existing



- Architectural Precast Concrete (APC)
- Lateral System
 - APC Shear Walls

Outline

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Proposal



- *Structural Depth Study*
 - *Request of Additional 3-Stories for Office Space*
 - *Redesign using Composite Steel Framing utilizing Concentrically Braced Frames (CBF) for Lateral*

Proposal

- Structural Depth Study
- Architectural Breadth Study
 - Ramifications of Additional 3-Stories to Architectural Program and Overall Exterior Vision
- Construction Management Breadth Study
 - Relative Cost Comparison of Different Framing Systems

Outline

- Overview of Existing
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- **Structural Depth Study**
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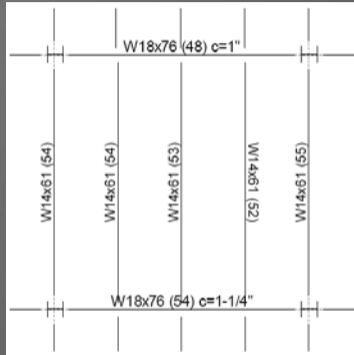


Structural Depth Study

- Existing Floor System
 - APC Hollow-Core Plank System

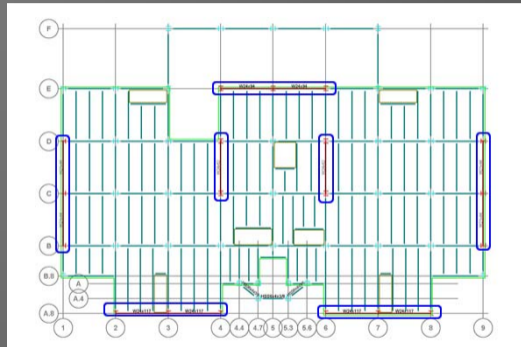
- Proposed Composite Floor System
 - 3" USD Metal Deck w/ 3" L.W.C.

Structural Depth Study



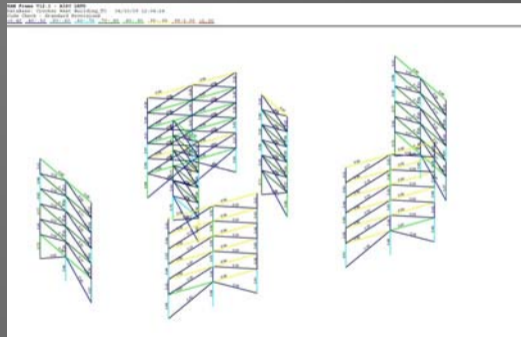
- In-fill Beams
 - W14x61
- Girders
 - W18x76
- Columns
 - Range from W12x40 to W14x211

Structural Depth Study



- Existing Lateral System
 - APC Shear Walls
- Proposed Lateral System
 - Concentrically Braced Frames (CBF)

Structural Depth Study

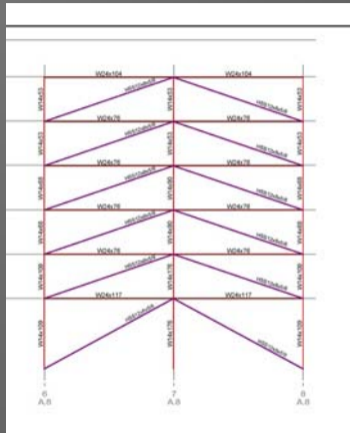


- Lateral Framing
 - Total of Seven (7) CBF's
 - HSS Bracing Utilized
 - Symmetrical Layout Hinders Torsional Irregularities
- RAM
 - Used to Analyze and Design
 - Drift, Story Drift, Torsion Included in Design Checks

Structural Depth Study

➤ Bracing

- HSS used for all CBF's
- HSS 12 x 8 x 5/8" typical size



Structural Depth Study



- CBF Pro's & Con's
 - Easy Installation/ Fast Erection Time
 - Cheaper than Moment Frames
 - Bracing Alters Program Requirements
- Architectural Function
 - Used to accentuate exterior views by exposing CBF

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Architectural Breadth Study



➤ *3-D Modeling*

- *Building Information Modeling (BIM)*
- *Autodesk Revit Architecture*

➤ *Architecture*

- *New Exterior Façade introduces New Style of Architecture to surrounding area*

Architectural Breadth Study



- *Additional 3-Stories*
 - *Nearly Doubles Existing Height (79 ft Mean Roof Ht.)*
 - *APC Height Limitations*
- *Facade*
 - *Metal Panel w/ Glazing In-fill*
 - *Glass Curtain Walls*

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CM Breadth Study

➤ *Cost*

- *APC cost estimated \$3.95 Million*
- *Steel cost estimated \$3.1 Million*

➤ *Schedule*

- *Similar Erection Times (APC vs. Steel)*
- *Façade could prove to be largest difference between systems*
- *13 month schedule would be difficult to beat*

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Summary/Conclusions

- *Structural*
 - *Steel Proved Viable*
 - *CBF Later System Design limits serviceability issues*
 - *Seismic Weight Reduced by switching to steel*
- *Architectural*
 - *New Architectural Style to surrounding area*
 - *Maintained Overall Architectural Program*
- *Construction Management*
 - *Cost and Schedule Comparable*

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Acknowledgements

- Scott Smith and Scott Smeal of
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- AE Faculty and Staff
- On-line Mentors
- ALL MY FAMILY and FRIENDS

Thank You!

Questions

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