



# MILESTONE BUILDING #4

Kristen Marie Hlopick  
Construction Management

Germantown, Maryland  
Dr. David Riley

# OVERVIEW

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Introduction *Project Background*

Critical Research *LEED Guide for Trade Contractors*

Architectural Breadth *Interior Tenant Fit Out*

Structural Breadth *Parking Garage*

Acknowledgements

Questions

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# INTRODUCTION

PROJECT BACKGROUND



## Introduction Project Background

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# INTRODUCTION

## PROJECT BACKGROUND



Location: Milestone Business Park, Germantown Maryland

LEED Certified: Core and Shell Silver Certification

Occupancy: WeatherBug<sup>®</sup> Office Space

Size: 166,292 SF

Number of Stories: Six

Schedule: June 29, 2007 – September 30, 2008 (15 Months)

Cost: ~\$19 Million, LEED CO of \$478,000

Project Delivery Method: Design Bid Build

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# INTRODUCTION

## PROJECT BACKGROUND



### Project Team

Owner: **Kennedy Associates**

Developer: **Trammell Crow Company**

Leaser: **CB Richard Ellis**

Architect: **Morgan Gick McBeath and Associates**

Contractor: **Buch Construction**

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# RESEARCH

LEED GUIDE FOR TRADE CONTRACTORS



## Critical Research

### LEED Guide for Trade Contractors

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# RESEARCH

## LEED GUIDE FOR TRADE CONTRACTORS



### Problem Statement

- All new construction must be LEED certified
- Lack of knowledge with trade contractors
- Unable to fulfill LEED requirements

### Goal

- First time users
- MR 2, MR 4, MR 5
- Information Pamphlet
- LEED Guide for Trade Contractors

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# RESEARCH

## LEED GUIDE FOR TRADE CONTRACTORS



### Procedure

- Create a survey
- Develop LEED Information Pamphlet
- Develop LEED Guide for Trade Contractors
- Test pamphlet and guide
- Process survey results
- Make any necessary adjustments

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# RESEARCH

## LEED GUIDE FOR TRADE CONTRACTORS



### Problem Identification Survey

Do you feel that you have adequate knowledge of the LEED process?

No

Do you feel that a LEED guide for trade contractors would be beneficial?

Yes

Complications with LEED requirements for...

Submittals: 90%

Recycled Content: 65%

Local Materials: 85%

\*\*\*Complications are from industry members who have implemented LEED for the first time.\*\*\*

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# RESEARCH

## LEED GUIDE FOR TRADE CONTRACTORS



### LEED Guide

#### Focuses on Credits:

- MR2 *Construction Waste Management*
- MR4 *Recycled Content*
- MR5 *Local/Regional Materials*

#### Focuses on LEED requirements:

- Submittals
- Design
- Construction Waste Management

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# RESEARCH

## LEED GUIDE FOR TRADE CONTRACTORS



### Samples

Construction Submittals		Const Waste Mgmt	Conc. Reinforcing	CIP Conc.	Precast Arch. Conc.	Masonry Mortaring & Grouting	Unit Masonry
		\$ .1	\$ .2	\$ .3	\$ .4	\$ .5	\$ .6
CS.1	LEED letter template for Credit MR 2.1 and Credit MR 2.2, signed by contractor, tabulating total waste material, quantities diverted and means by which it is diverted and statement that requirements for the credit have been met.	X					
CS.2	Submit certification/letter from material supplier(s) indicating percentages by weight of post-consumer and pre-consumer recycled content for products having recycled content for Credit MR 4		X	X	X	X	X
CS.3	Provide documentation identifying manufacturer and extraction, harvest, and/or recover location of materials provided under this section for Credit MR 5		X	X	X	X	X

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# RESEARCH

## LEED GUIDE FOR TRADE CONTRACTORS



### Samples

Design Requirements		CIP Conc.	Precast Arch. Conc.	Masonry Mortaring and Grouting	Unit Masonry - Brick	Unit Masonry - CMU	Calcium Silicate Bldg. Stone	Structural Steel Framing	Steel Decking	Cold-Formed Metal Framing	Metal Fabrications	Metal Stairs	Metal Railings
		\$-1	\$-2	\$-3	\$-4	\$-5	\$-6	\$-7	\$-8	\$-9	\$-10	\$-11	\$-12
DR.1	Materials shall be manufactured and of raw materials extracted within 500 miles of project site.	X	X	X	X	X	X	X	X	X	X	X	X
DR.2	Provide products from manufacturers with program for reclaiming construction scrap, waste materials, and packaging.									X		X	
DR.3	Provide materials with recycled content such that sum of post-consumer recycled content plus one-half of pre-consumer recycled content is not less than 10% to 20%.			X									
DR.4	Provide materials with recycled content such that sum of post-consumer recycled content plus one-half of pre-consumer recycled content is not less than 10% to 25%.	X											

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# RESEARCH

## LEED GUIDE FOR TRADE CONTRACTORS



### Samples

Waste Management		Tempered Glass Railings	Misc. Rough Carpentry	Gypsum Sheathing	Architectural Woodwork	Building Insulation	Cementitious Waterproofing	Thermal Insulation	Metal Panels	Thermoplastic Membrane Roofing	Cementitious Fireproofing	Firestopping
		S.16	S.17	S.18	S.19	S.20	S.21	S.22	S.23	S.24	S.25	S.26
WS.59	Separate and recycle waste materials in compliance with Waste Management Plan	X	X		X	X	X	X	X	X	X	X
WS.60	a. Place materials defined as hazardous or toxic waste in designated containers.				X	X			X		X	X
WS.61	b. Use trigger operated spray nozzles for water hoses						X			X	X	X
WS.62	c. Fold up metal banded, flatten, and place in designated area.		X		X	X	X	X		X		
WS.63	d. Collect wood packing shims and pallets and place in designated area	X			X	X			X			
WS.64	e. Separate corrugated cardboard in compliance with Waste Management Plan and place in designated areas for recycling.	X			X	X	X	X	X	X		

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# RESEARCH

## LEED GUIDE FOR TRADE CONTRACTORS



### Samples

### *Submittals*

#### **S.1 01 7419 Disposal**

LEED letter template for Credit MR 2.1 and Credit MR 2.2, signed by contractor, tabulating total waste material, quantities diverted and means by which it is diverted and statement that requirements for the credit have been met.

#### **S.2 03 2000 Concrete Reinforcing**

Submit certification/letter from material supplier(s) indicating percentages by weight of post-consumer and pre-consumer recycled content for products having recycled content for Credit MR 4

Provide documentation identifying manufacturer and extraction, harvest, and/or recover location of materials provided under this section for Credit MR 5

#### **S.4 03 4500 Precast Architectural Concrete**

Submit certification/letter from material supplier(s) indicating percentages by weight of post-consumer and pre-consumer recycled content for products having recycled content for Credit MR 4

Provide documentation identifying manufacturer and extraction, harvest, and/or recover location of materials provided under this section for Credit MR 5

#### **S.5 04 0510 Masonry Mortaring and Grouting**

Submit certification/letter from material supplier(s) indicating percentages by weight of post-consumer and pre-consumer recycled content for products having recycled content for Credit MR 4

Provide documentation identifying manufacturer and extraction, harvest, and/or recover location of materials provided under this section for Credit MR 5

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# RESEARCH

## LEED GUIDE FOR TRADE CONTRACTORS



### Samples

### Design Requirements

S.1 03 3000

#### CIP Concrete

Materials shall be manufactured and of raw materials extracted within 500 miles of project site.

Provide materials with recycled content such that sum of post-consumer recycled content plus one-half of pre-consumer recycled content is not less than 10% to 25%.

S.2 03 4500

#### Precast Architectural Concrete

Materials shall be manufactured and of raw materials extracted within 500 miles of project site.

Provide materials with recycled content such that sum of post-consumer recycled content plus one-half of pre-consumer recycled content is not less than 25% to 50%.

S.3 04 0510

#### Masonry Mortaring and Grouting

Materials shall be manufactured and of raw materials extracted within 500 miles of project site.

Provide materials with recycled content such that sum of post-consumer recycled content plus one-half of pre-consumer recycled content is not less than 10% to 20%.

S.4 04 2000

#### Unit Masonry - Brick

Materials shall be manufactured and of raw materials extracted within 500 miles of project site.

Provide materials with recycled content such that sum of post-consumer recycled content plus one-half of pre-consumer recycled content is not less than 25% to 50%.

Materials used in manufacture of clay brick may incorporate contaminated waste that is neutralized or otherwise rendered inert by a manufacturing process that does not discharge additional pollutants.

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# RESEARCH

## LEED GUIDE FOR TRADE CONTRACTORS



### Samples

### *Construction Waste Management*

#### **S.1 02 4119 Earthwork**

Separate and handle general construction waste in compliance with Waste Management Plan

#### **S.2 02 4119 Selective Demolition**

Demolition shall be performed in a manner that maximizes salvage and recycling of materials and includes dismantling and removal of materials. Materials dismantled and removed shall be separated, set aside, prepared for reuse, and stored or delivered to collection point for reuse to maximum extent economically feasible.

Items listed below have unique or regulated disposal requirements and are to be removed and disposed of in manner dictated by law or in most environmentally responsible manner. Typical concerns are listed in parentheses:

#### **S.3 03 1000 Concrete Forming and Accessories**

Separate wood waste in compliance with Waste Management Plan and place in designated areas in following categories for recycling

- a. Solid wood/softwood/hardwood
- b. Composite wood (for example, plywood, OSB, I-joist, parallel strand, MDF, particleboard)
- c. Treated, painted, or contaminated wood

Separate and recycle waste steel formwork accessories in compliance with Waste Management Plan

#### **S.4 03 2000 Concrete Reinforcing**

Separate and recycle waste reinforcing steel materials in compliance with Waste Management Plan

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# RESEARCH

LEED GUIDE FOR TRADE CONTRACTORS



## Outcome

### LEED Guide Survey Response

Was it user friendly?

Yes

Was it easy to understand?

Yes

Did you find it helpful?

Yes

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# RESEARCH

## LEED GUIDE FOR TRADE CONTRACTORS



### Conclusion

- Survey verifies that a problem exists
- Credits MR 2, MR 4, MR 5
- LEED Information Pamphlet
- LEED Guide for Trade Contractors
- LEED Guide Survey verifies success

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# RESEARCH

LEED GUIDE FOR TRADE CONTRACTORS



## Reflection

- Surprised about lack of knowledge
- Problem still exists
- Attitude Change - Marketing Ploy

## Industry Advancement

- Computer program
- More Specific
- Trade Division

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# ARCHITECTURE

INTERIOR TENANT FIT OUT



## Technical Analysis I: Architectural Breadth Interior Tenant Fit Out

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# ARCHITECTURE

## INTERIOR TENANT FIT OUT



### Opportunity Statement

- Core and shell building
- New tenant
- Design space per client's requirements

### Goal

- Design tenant space
- LEED for Commercial Interiors
- Material List

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# ARCHITECTURE

## INTERIOR TENANT FIT OUT



### Procedure

- Interview client; WeatherBug<sup>®</sup>
- Design space
- Receive input
- Make changes
- Choose materials

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# ARCHITECTURE

## INTERIOR TENANT FIT OUT



### Space Requirements

- Learning Center
- 2<sup>nd</sup> Floor
- 6,500 SF – 7,000 SF
- 2 Classrooms
- 2 Conference Rooms
- 6 Offices
- 14 Cubicles
- Copy/File/Fax
- Lounge
- Reception Area

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# ARCHITECTURE

INTERIOR TENANT FIT OUT



Outcome *Design (Base Building)*



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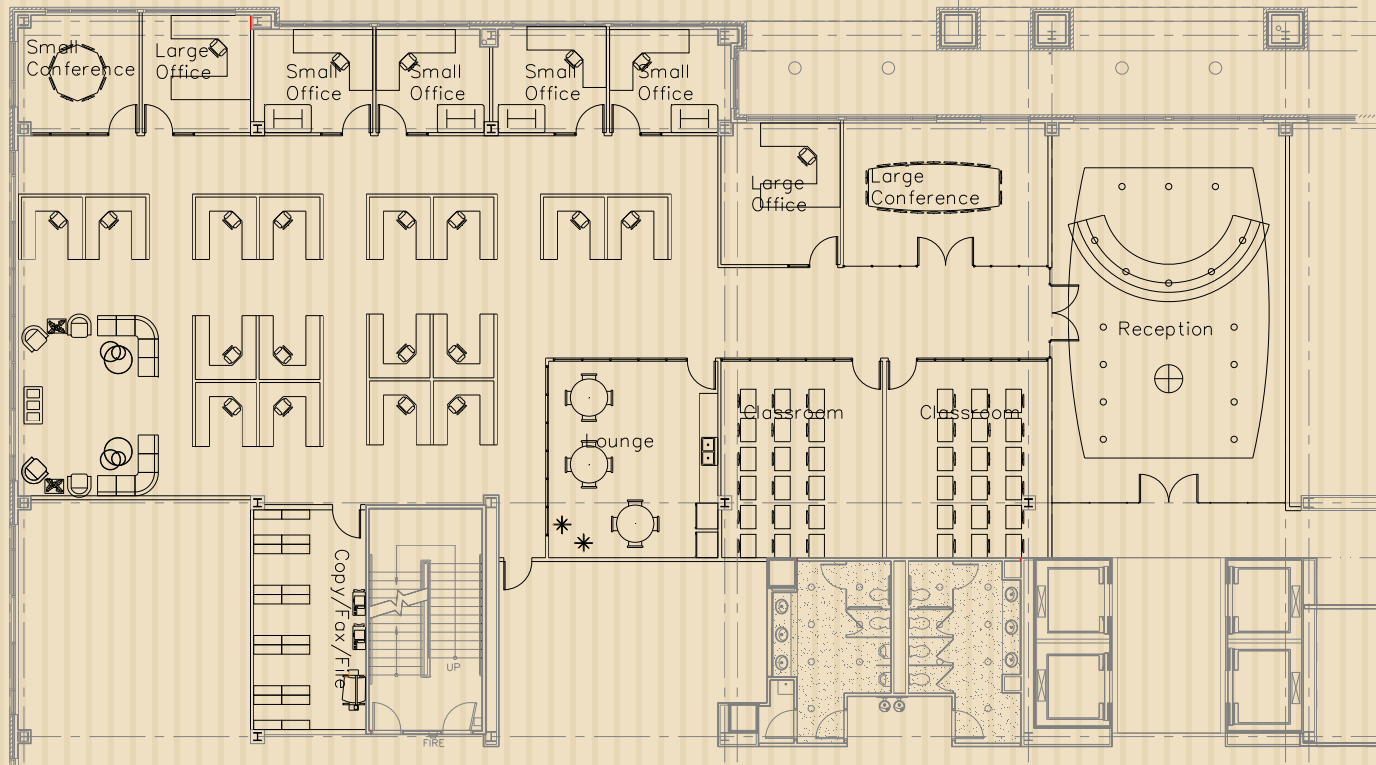


# ARCHITECTURE

## INTERIOR TENANT FIT OUT



### Outcome *Design (TFO)*



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# ARCHITECTURE

## INTERIOR TENANT FIT OUT



### Materials

EGGERS FLUSH DOORS** LEED Categories and Credit Classifications	PC-5 Agrifiber Core	PC-5 Standard PB Core	PC-5 UFF PB	PC-5 FSC UFF PB	SLC-5 Certified Stave Core	SCLC-5 Structural Composite	MC-5 Mineral Core
Credit MR #4: Recycled Content*	2	2	2	2	0	0	0
Credit MR #6.0: Rapidly Renewable Materials	1	0	0	0	0	0	0
Credit MR #7.0: Certified Wood	0	0	0	1	1	0	0
Credit EQ #4.4: Composite wood, agrifiber and adhesives contain no added urea-formaldehyde***	1	0	1	1	1	1	1
Total points possible with Eggers Flush Doors	4	2	3	4	2	1	1

### Doors

- Eggers Industry
- FSC Certified
- VOC Free



### Tile

- EnviroGLAS
- Local Material
- Recycled Glass
- EcoTop
- Bamboo Fiber
- VOC Free



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# ARCHITECTURE

INTERIOR TENANT FIT OUT



## Conclusion

- Energy efficient
- Environmentally friendly
- Healthier work environment
- Cost concerns

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# STRUCTURAL

PARKING GARAGE



## Technical Analysis II: Structural Breadth Impervious Surface Parking vs. Parking Garage

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# STRUCTURAL

PARKING GARAGE



## Problem Statement

- Impervious asphalt parking
- Non-sustainable site
- Restricts 3 LEED Sustainable Sites points

## Goal

- Sustainable site
- Parking structure
- Free space considerations

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# STRUCTURAL

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PARKING GARAGE



## Procedure

- Determine allowable site usage
- Architectural Design
- Structural Design
- Cost analysis
- Schedule impacts

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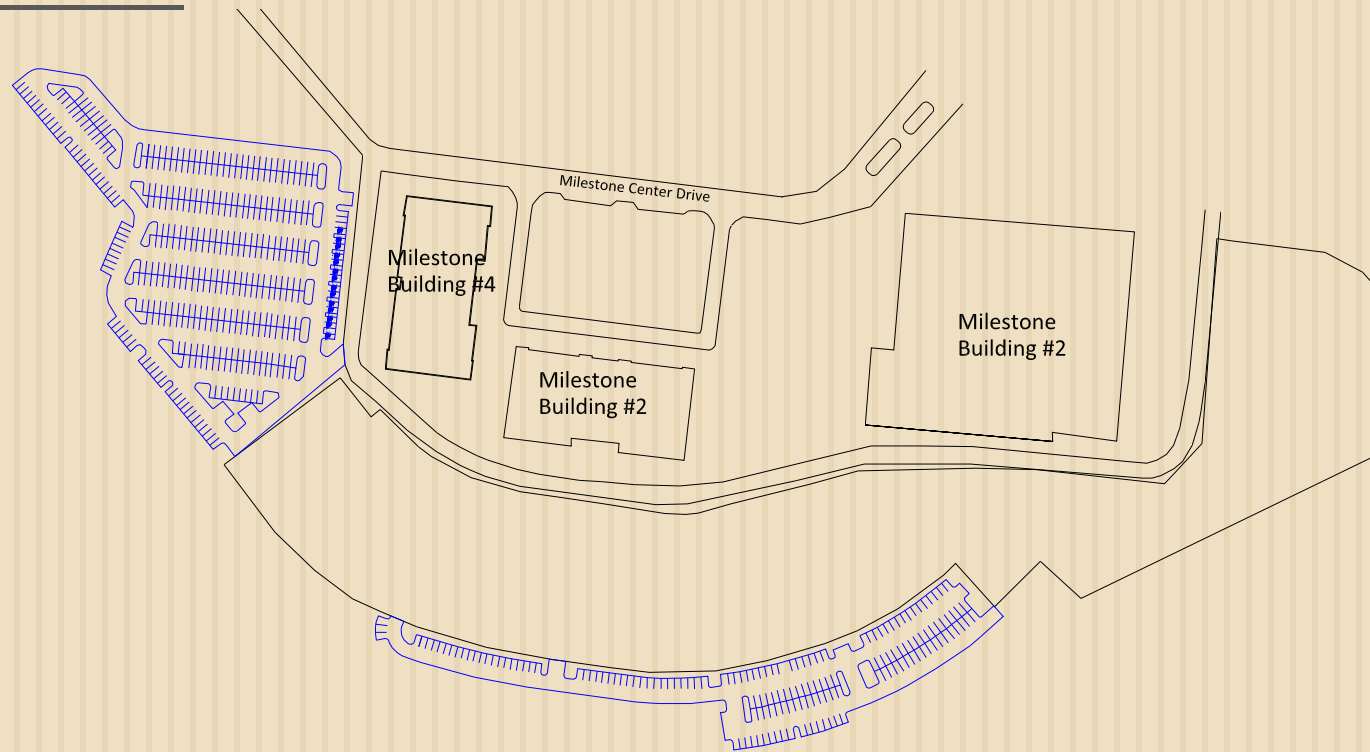
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# STRUCTURAL

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## Site Location



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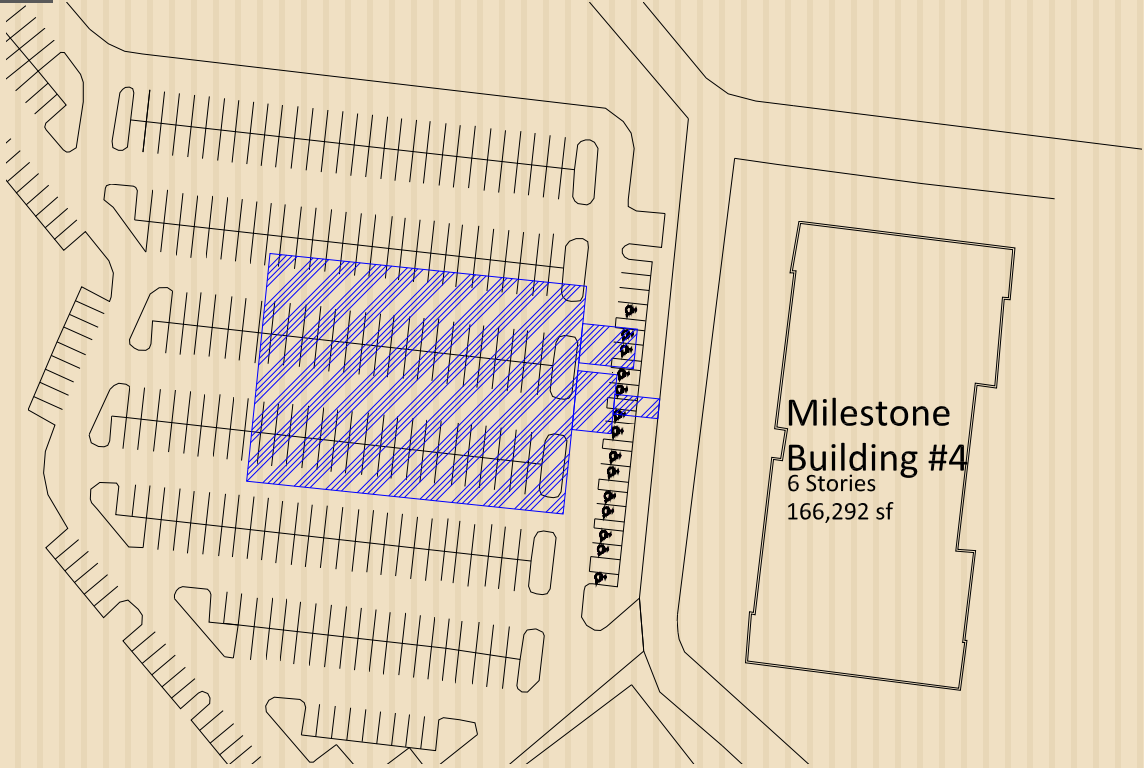
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# STRUCTURAL

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## Site Location



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# STRUCTURAL

PARKING GARAGE



## Architectural Design



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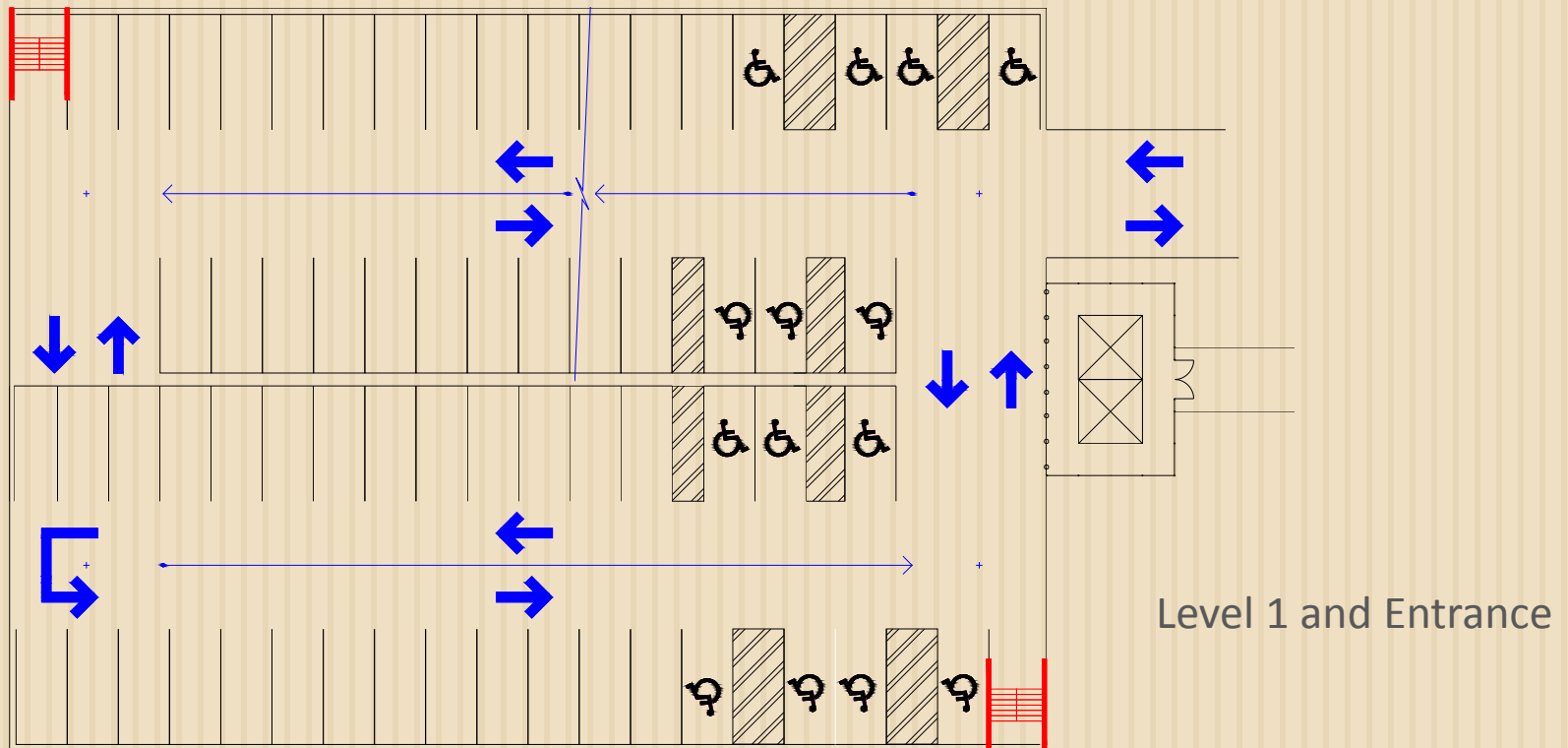
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# STRUCTURAL

PARKING GARAGE



## Architectural Design



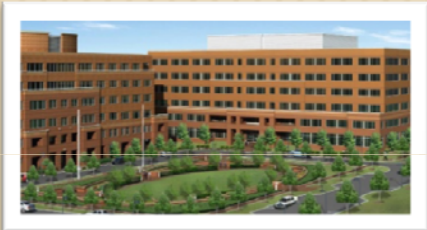
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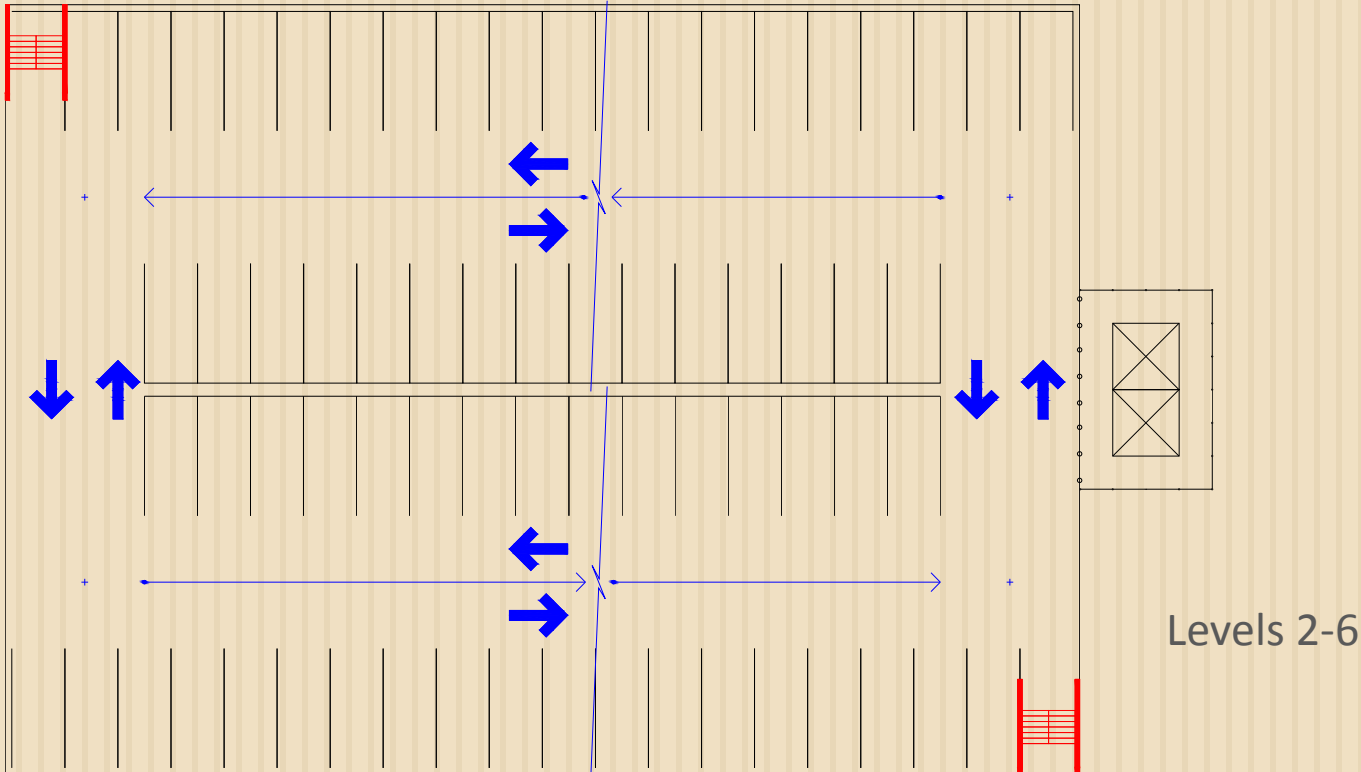
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# STRUCTURAL

PARKING GARAGE



## Architectural Design



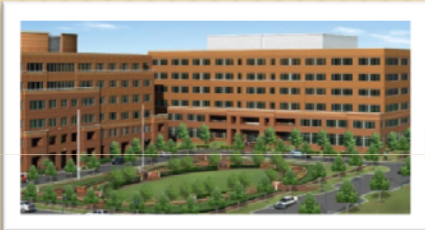
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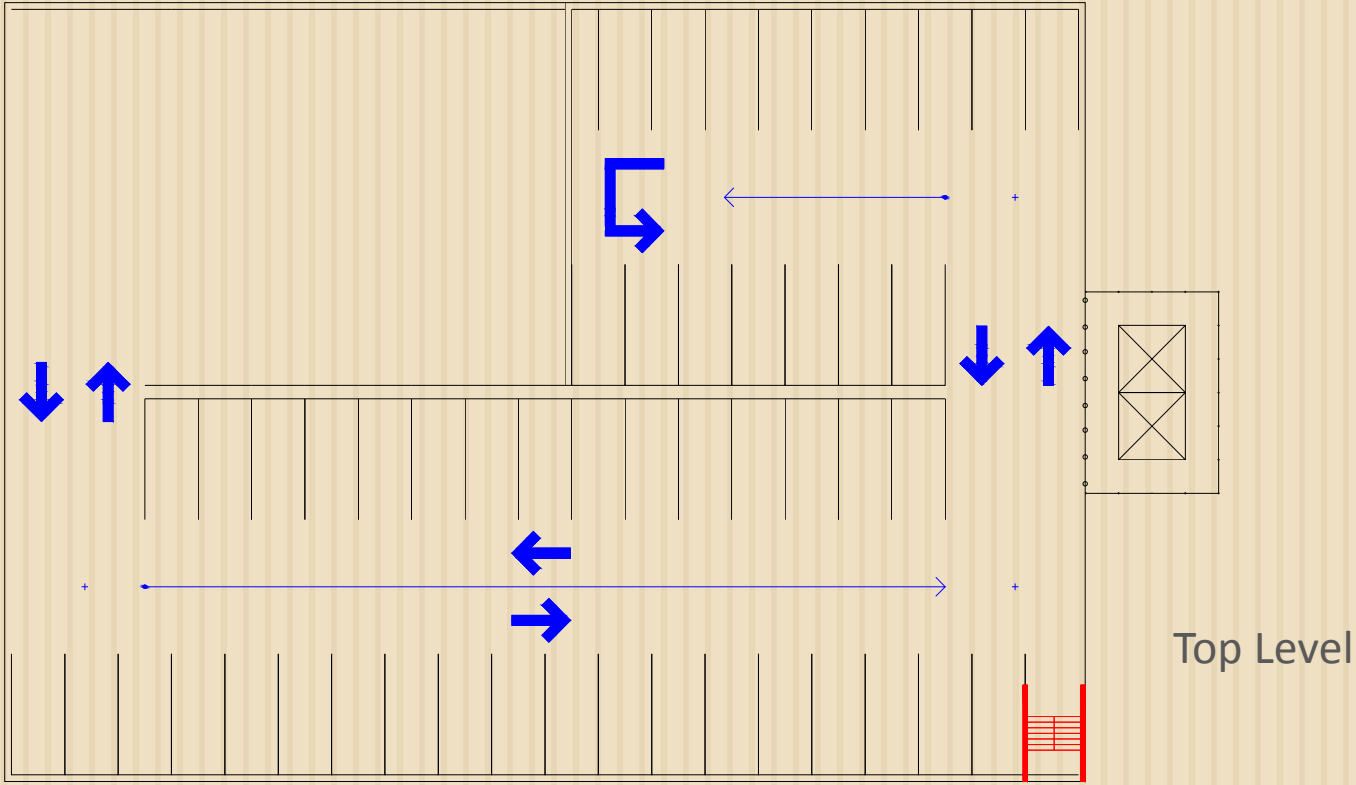
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# STRUCTURAL

PARKING GARAGE



## Architectural Design



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# STRUCTURAL

## PARKING GARAGE



### Structural Design

#### Double T's

8DT24

#### L Beams

20LB24

#### Inverted T's

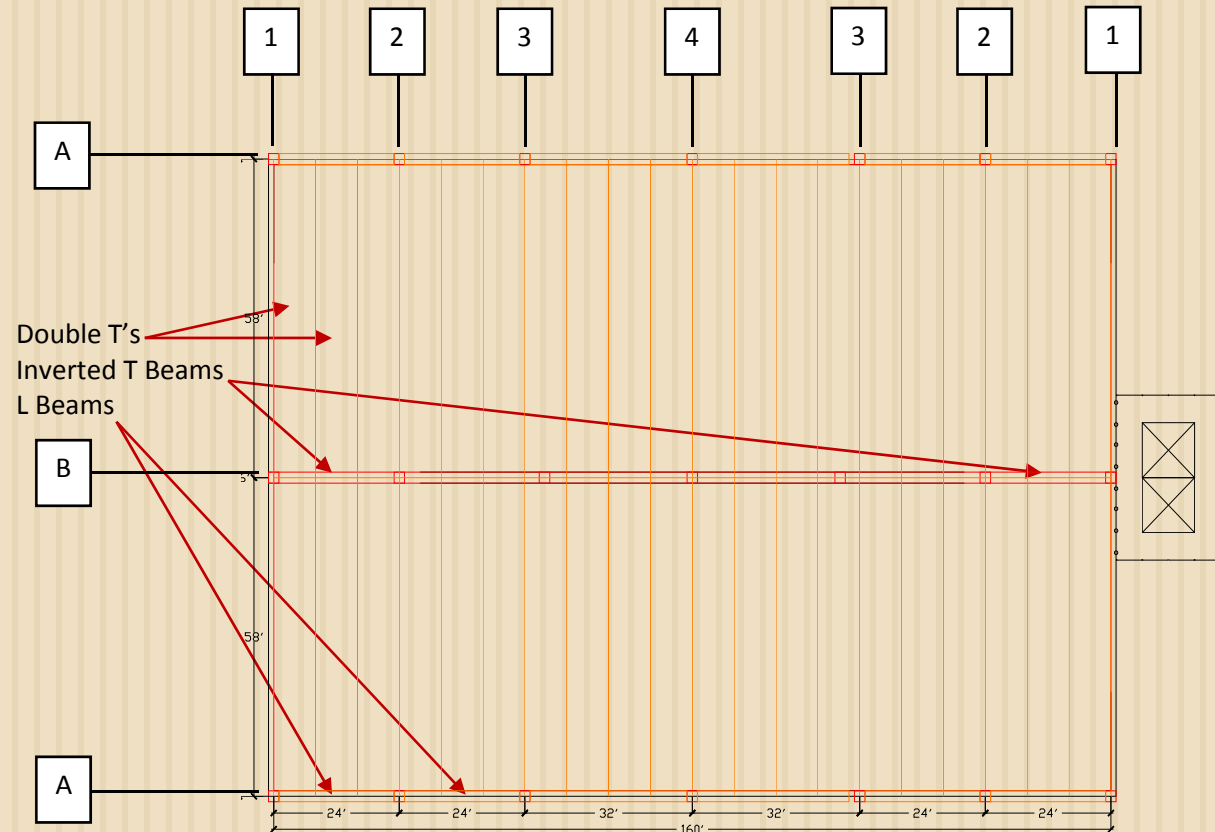
28IT32

#### Columns

20X20

18X18

14X14



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# STRUCTURAL

PARKING GARAGE



## Cost

RS Means: \$48.97/SF or \$6,138,097

Nitterhouse Concrete Products:

	Cost	Unit	Span (ft)	Width (ft)	Subtotal	Quantity	Total
Double T	\$15.00	SF	58	8	\$6,960.00	256	\$1,781,760.00
L Beam	\$250.00	LF	24		\$6,000.00	74	\$444,000.00
L Beam	\$250.00	LF	32		\$8,000.00	50	\$400,000.00
Inverted T	\$300.00	LF	24		\$7,200.00	11	\$79,200.00
14x14	\$39.00	LF	9		\$351.00	38	\$13,338.00
18x18	\$273.00	LF	9		\$2,457.00	9	\$22,113.00
20x20	\$415.00	LF	9		\$3,735.00	2	\$7,470.00
<b>Total</b>							

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# STRUCTURAL

PARKING GARAGE



## Schedule

Columns	3.75 days
Double T's	16 days
L Beams	5.39 days
Inverted T	0.48 days
Total Duration:	<b>33 working days (RS Means)</b> <b>15 working days (Nitterhouse)</b>

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# STRUCTURAL

PARKING GARAGE



## Conclusion

- Sustainability benefits
- Free space
- Increase schedule
- Increase cost

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AE Faculty

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Survey Consultants

AE Students

Family and Friends

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