



Decision Name: Choosing an Elevator Design for a Hospital

Project: Use Cases

01. Decision Summary

Due Date	Decision Status	Selected Alternative
2016-05-11	In Progress	Modernize existing elevator and rai...

Objective

The Hospital does not have a helipad and would like to investigate the opportunity of adding one. How to transport patients from roof helipad to emergency department.

Collaborators

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02. Alternatives

New elevator adjacent to existing elevator

New elevator located West of stair 3

New elevator adjacent to screen wall

Modernize existing elevator and raise penthouse roof

Replace existing elevator

03. Factors & Criteria

Amount of structural modifications required

Amount of days elevator will be down

Length of access path required to elevators

Amount of spaces affected on 5th floor

Revisions to existing roof

Zoning & FAA requirements

Must Criterion : must meet requirements

Require life safety modifications on 6th floor

Structural analysis required

Amount of above ceiling modifications needed on 5/6 floor

04. Attributes

Amount of structural modifications required

Modernize existing elevator and ...: construct area for equipment	Met meet must criterion ✓
New elevator adjacent to existin...: hole in roof, new shear wall and beams	Met meet must criterion ✓
New elevator adjacent to screen ...: cut roof, cut column strips	Met meet must criterion ✓
New elevator located West of sta...: cut roof, create sump pit	Met meet must criterion ✓
Replace existing elevator: new sump pit	Met meet must criterion ✓

Amount of days elevator will be down

Modernize existing elevator and ...: 18 weeks or less	Met meet must criterion ✓
New elevator adjacent to existin...: 36 weeks or less	Met meet must criterion ✓
New elevator adjacent to screen ...: 18 weeks or less	Met meet must criterion ✓
New elevator located West of sta...: 36 weeks or less	Met meet must criterion ✓
Replace existing elevator: 36 weeks or less	Met meet must criterion ✓

Length of access path required to elevators

Modernize existing elevator and ...: 60' or less	Met meet must criterion ✓
New elevator adjacent to existin...: 20' or less	Met meet must criterion ✓
New elevator adjacent to screen ...: 45' or less	Met meet must criterion ✓
New elevator located West of sta...: 20' or less	Met meet must criterion ✓
Replace existing elevator: 185' or less	Met meet must criterion ✓

Amount of spaces affected on 5th floor

Modernize existing elevator and ...: no space affected	Met meet must criterion ✓
New elevator adjacent to existin...: 360 sqft	Met meet must criterion ✓
New elevator adjacent to screen ...: 360 sqft	Met meet must criterion ✓
New elevator located West of sta...: 360 sqft	Met meet must criterion ✓
Replace existing elevator: no space affected	Met meet must criterion ✓

Revisions to existing roof

Modernize existing elevator and ...: relocate elevator exhaust	Met meet must criterion ✓
New elevator adjacent to existin...: relocate elevator exhaust	Met meet must criterion ✓
New elevator adjacent to screen ...: relocate some mechanical equipmen...	Met meet must criterion ✓
New elevator located West of sta...: relocate kitchen exhaust & fans	Met meet must criterion ✓
Replace existing elevator: no relocation	Met meet must criterion ✓

Zoning & FAA requirements
Must Criterion: must meet requirements

Modernize existing elevator and ...: meets requirement	Met meet must criterion ✓
New elevator adjacent to existin...: meets requirement	Met meet must criterion ✓
New elevator adjacent to screen ...: meets requirement	Met meet must criterion ✓
New elevator located West of sta...: meets requirement	Met meet must criterion ✓
Replace existing elevator: does not meet requirement	Does not meet must criterion ✗

Require life safety modifications on 6th floor

Modernize existing elevator and ...: no modifications required	Met meet must criterion ✓
New elevator adjacent to existin...: major modifications required	Met meet must criterion ✓
New elevator adjacent to screen ...: minor modifications required	Met meet must criterion ✓
New elevator located West of sta...: minor modifications required	Met meet must criterion ✓
Replace existing elevator: no modifications required	Met meet must criterion ✓

Structural analysis required

Modernize existing elevator and ...: 40 hours or less	Met meet must criterion ✓
New elevator adjacent to existin...: 40 hours or less	Met meet must criterion ✓
New elevator adjacent to screen ...: 40 hours or less	Met meet must criterion ✓
New elevator located West of sta...: 40 hours or less	Met meet must criterion ✓
Replace existing elevator: 40 hours or less	Met meet must criterion ✓

Amount of above ceiling modifications needed on 5/6 floor

Modernize existing elevator and ...: None required	Met meet must criterion ✓
New elevator adjacent to existin...: large amount of piping, fuel lines, and...	Met meet must criterion ✓

New elevator adjacent to screen ...: small amount of HVAC ducts

Met meet must criterion ✓

New elevator located West of sta...: small amount of HVAC ducts

Met meet must criterion ✓

Replace existing elevator: None required

Met meet must criterion ✓

05. Advantages

Amount of structural modifications required

construct area for equipment	Advantage: Heavy structural modifications	Least Preferred Attribute	✘
hole in roof, new shear wall and beams	Advantage: medium structural modifications		
cut roof, cut column strips	Advantage: light structural modifications		
cut roof, create sump pit	Advantage: light structural modifications	Most Important Advantage	★
new sump pit	Advantage: None		

Amount of days elevator will be down

18 weeks or less	Advantage: 18 weeks less	Most Important Advantage	★
36 weeks or less	Advantage: None	Least Preferred Attribute	✘
18 weeks or less	Advantage: 18 weeks less		
36 weeks or less	Advantage: No advantage		
36 weeks or less	Advantage: None		

Length of access path required to elevators

60' or less	Advantage: None	Least Preferred Attribute	✘
20' or less	Advantage: 40' less		
45' or less	Advantage: 15' less	Most Important Advantage	★
20' or less	Advantage: 40' less		
185' or less	Advantage: None		

Amount of spaces affected on 5th floor

no space affected	Advantage: 360 sqft less	Most Important Advantage	★
360 sqft	Advantage: no advantage		
360 sqft	Advantage: no advantage		

360 sqft	Advantage: None	Least Preferred Attribute	✘
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no space affected	Advantage: None		
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Revisions to existing roof

relocate elevator exhaust	Advantage: relocate elevator exhaust	Most Important Advantage	★
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relocate elevator exhaust	Advantage: relocate elevator exhaust		
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relocate some mechanical equipment & fans	Advantage: None	Least Preferred Attribute	✘
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relocate kitchen exhaust & fans	Advantage: relocate elevator exhaust & fan		
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no relocation	Advantage: None		
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Zoning & FAA requirements

meets requirement	Advantage: None	Least Preferred Attribute	✘
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meets requirement	Advantage: No advantage		
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meets requirement	Advantage: No advantage		
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meets requirement	Advantage: No advantage		
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Require life safety modifications on 6th floor

no modifications required	Advantage: no modifications required	Most Important Advantage	★
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major modifications required	Advantage: None	Least Preferred Attribute	✘
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minor modifications required	Advantage: minor modifications required		
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minor modifications required	Advantage: minor modifications required		
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no modifications required	Advantage: None		
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Structural analysis required

40 hours or less	Advantage: None	Least Preferred Attribute	✘
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40 hours or less	Advantage: none		
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40 hours or less Advantage: none

40 hours or less Advantage: none

40 hours or less Advantage: None

Amount of above ceiling modifications needed on 5/6 floor

None required Advantage: no coordination required Most Important Advantage ★

large amount of piping, fuel lines, and conduit Advantage: None Least Preferred Attribute ✖

small amount of HVAC ducts Advantage: some coordination required

small amount of HVAC ducts Advantage: some coordination required

None required Advantage: None

06. Importance of Advantages

Amount of structural modifications required

Alternative	Attribute	Advantage	Weight of Advantage
Modernize existing elevat...	construct area for equipme...	None	
New elevator adjacent to ...	hole in roof, new shear wall...	medium structural modifications	50
New elevator adjacent to ...	cut roof, cut column strips	light structural modifications	66
New elevator located We...	cut roof, create sump pit	light structural modifications	66

Amount of days elevator will be down

Alternative	Attribute	Advantage	Weight of Advantage
Modernize existing elevat...	18 weeks or less	18 weeks less	57
New elevator adjacent to ...	36 weeks or less	None	
New elevator adjacent to ...	18 weeks or less	18 weeks less	57
New elevator located We...	36 weeks or less	No advantage	0

Length of access path required to elevators

Alternative	Attribute	Advantage	Weight of Advantage
Modernize existing elevat...	60' or less	None	
New elevator adjacent to ...	20' or less	40' less	24
New elevator adjacent to ...	45' or less	15' less	35
New elevator located We...	20' or less	40' less	24

Amount of spaces affected on 5th floor

Alternative	Attribute	Advantage	Weight of Advantage
Modernize existing elevat...	no space affected	360 sqft less	100*
New elevator adjacent to ...	360 sqft	no advantage	0
New elevator adjacent to ...	360 sqft	no advantage	0
New elevator located We...	360 sqft	None	

New elevator located We... 300 sq ft NONE

** Paramount Advantage*

Revisions to existing roof

Alternative	Attribute	Advantage	Weight of Advantage
Modernize existing elevat...	relocate elevator exhaust	relocate elevator exhaust	45
New elevator adjacent to ...	relocate elevator exhaust	relocate elevator exhaust	45
New elevator adjacent to ...	relocate some mechanical e...	None	
New elevator located We...	relocate kitchen exhaust & f...	relocate elevator exhaust & fan	18

Zoning & FAA requirements

Must Criteria : must meet requirements

Alternative	Attribute	Advantage	Weight of Advantage
Modernize existing elevat...	meets requirement	None	
New elevator adjacent to ...	meets requirement	No advantage	0
New elevator adjacent to ...	meets requirement	No advantage	0
New elevator located We...	meets requirement	No advantage	0

Require life safety modifications on 6th floor

Alternative	Attribute	Advantage	Weight of Advantage
Modernize existing elevat...	no modifications required	no modifications required	71
New elevator adjacent to ...	major modifications require...	None	
New elevator adjacent to ...	minor modifications require...	minor modifications required	42
New elevator located We...	minor modifications require...	minor modifications required	42

Structural analysis required

Alternative	Attribute	Advantage	Weight of Advantage
Modernize existing elevat...	40 hours or less	None	

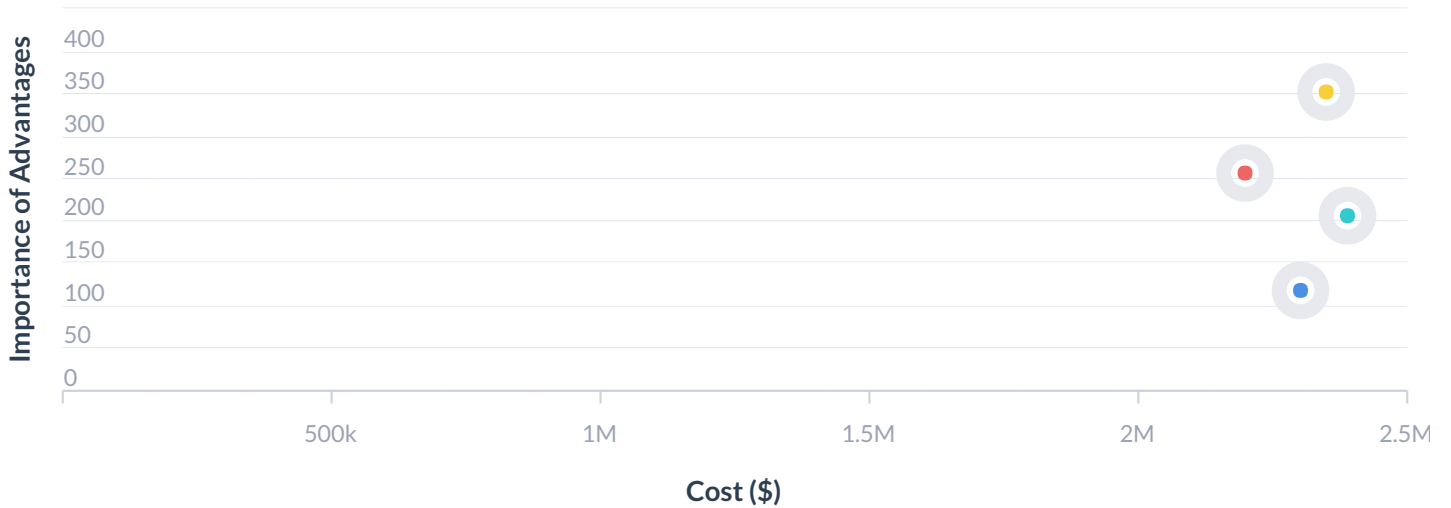
New elevator adjacent to ...	40 hours or less	none	0
New elevator adjacent to ...	40 hours or less	none	0
New elevator located We...	40 hours or less	none	0

Amount of above ceiling modifications needed on 5/6 floor			
Alternative	Attribute	Advantage	Weight of Advantage
Modernize existing elevat...	None required	no coordination required	80
New elevator adjacent to ...	large amount of piping, fuel...	None	
New elevator adjacent to ...	small amount of HVAC ducts	some coordination required	57
New elevator located We...	small amount of HVAC ducts	some coordination required	57

07. Costs

Alternative	--	--	--	--	Total Cost	Total*
New elevato...	\$0.00	\$0.00	\$0.00	\$0.00	\$2,300,000.00	\$2,300,000.00
New elevato...	\$0.00	\$0.00	\$0.00	\$0.00	\$2,390,000.00	\$2,390,000.00
New elevato...	\$0.00	\$0.00	\$0.00	\$0.00	\$2,200,000.00	\$2,200,000.00
Modernize e...	\$0.00	\$0.00	\$0.00	\$0.00	\$2,350,000.00	\$2,350,000.00
Replace exis...	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00

Importance of Advantages vs. Cost Graph



Alternative	Importance of Advantages	Cost
1 New elevator adjacent to exis...	119	\$2,300,000.00
2 New elevator located West of...	207	\$2,390,000.00
3 New elevator adjacent to scre...	257	\$2,200,000.00
4 Modernize existing elevator a...	353	\$2,350,000.00
5 Replace existing elevator	Does not meet must criteria	--

Selected Alternative	Importance of Advantages	Life Cycle Cost
Modernize existing elevator and rais...	353	\$2,350,000.00

Final Notes

We decided to modernize the elevator and raise the penthouse roof. It is one of the more expensive options but it gives us the highest total advantages.

Last Modified

May 29, 2016, 4:53 a.m.

