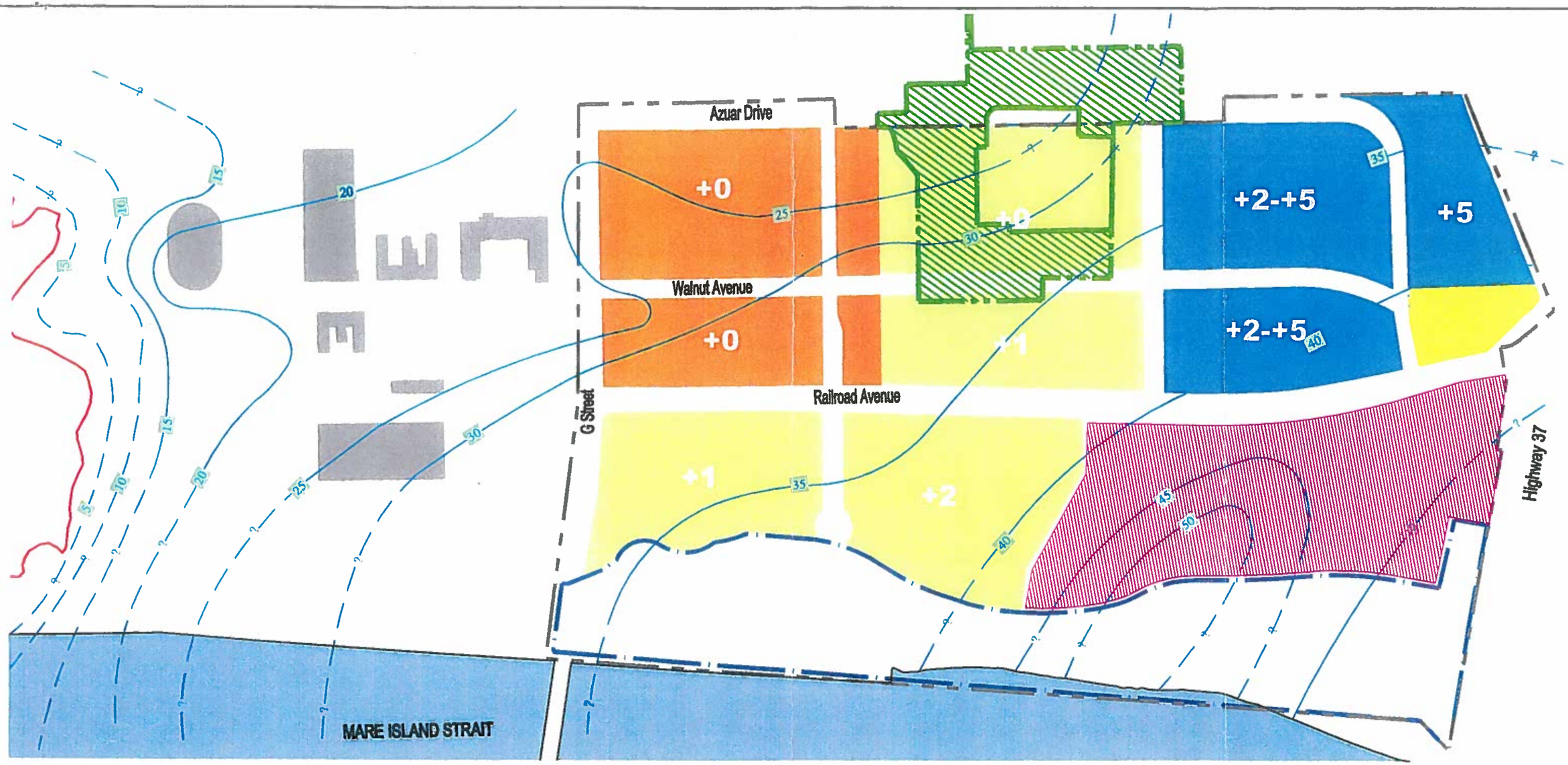
PRELIMINARY GEOTECHNICAL COST SUMMARY

NORTH MARE ISLAND DEVELOPEMENT
VALLEJO, CALIFORNIA

MARCH 2006

LENNAR MARE ISLAND

ENGEO INCORPORATED



EXPLANATION

- APPROXIMATE LIMITS OF AREA PROPOSED FOR MIXED-USE
- APPROXIMATE LIMITS OF AREA PROPOSED FOR OFFICE AND RESEARCH AND DEVELOPMENT
- APPROXIMATE LIMITS OF AREA PROPOSED FOR LIGHT INDUSTRIAL AND RESEARCH AND DEVELOPMENT
- APPROXIMATE LIMITS OF AREA PROPOSED FOR RECREATION
- APPROXIMATE LIMITS OF AREA PROPOSED FOR RETAIL
- APPROXIMATE LIMITS OF IR 17 ENVIRONMENTAL SITE
- APPROXIMATE LIMITS OF PROJECT AREA
- APPROXIMATE LIMITS OF AREA RESERVED FOR CONSERVATION
- 45 — APPROXIMATE THICKNESS OF RECENT BAY SEDIMENT
- APPROXIMATE LOCATION OF HISTORIC SHORELINE
- LOCATION OF EXISTING BUILDING TO REMAIN
- APPROXIMATE PROPOSED DESIGN FILL THICKNESS

N

0 FEET 400

0 METERS 200

THICKNESS CONTOURS OF RECENT BAY SEDIMENTS

MARE ISLAND
VALLEJO, CALIFORNIA

MARCH 2006

FIGURE 1

ENGEO INCORPORATED

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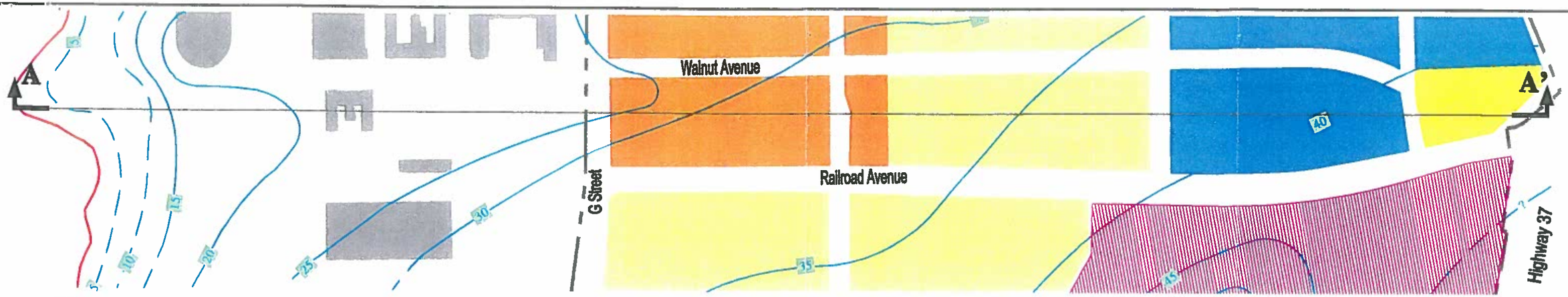

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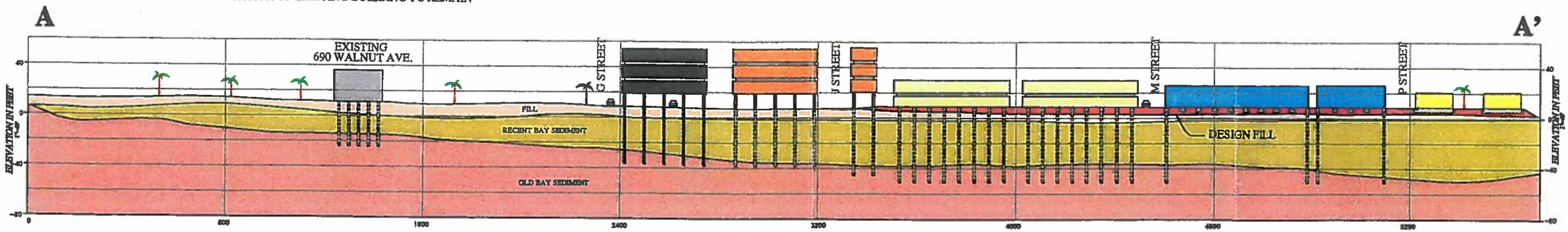
0 METERS 200



SECTION A-A'
SCALE 1"=400'

SECTION THROUGH NORTH OF ISLAND

MARE ISLAND
VALLEJO, CALIFORNIA

MARCH 2006

FIGURE 2

ENGEO INCORPORATED

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NORTH MARE ISLAND LAND USE DESCRIPTIONS

LAND USAGE BREAKDOWN

LAND USAGE	PERCENT
Office/R&D	25%
Light Industrial	15%
Mixed-Use	12%
Retail	2%
Road	10%
Recreation	13%
Conservation	23%
Total Land Usage	**100%**

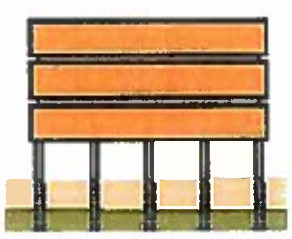
OFFICE/ R&D PARCEL:

Parcel Size	48.9 Acres
Assumed Typical Building Footprint Area	200 ft x 100 ft
Total Building Footprint Area	20,000 ft^2
Proposed Land Usage	Commercial
Two Proposed Building Types	3 stories steel frame
	2 stories concrete tilt-up
Anticipated Building Column Loads	120kips to 170 kips

LIGHT INDUSTRIAL:

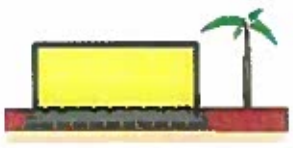
Parcel Size	28.5 Acres
Assumed Typical Building Footprint Area	400 ft x 200 ft
Total Building Footprint Area	80,000 ft^2
Proposed Land Usage	Light Industrial
Proposal Building Type	1 story concrete tilt-up
Anticipated Building Column Loads	< 100kips

MIXED-USE PARCEL:



Parcel Size	22.4 Acres
Assumed Typical Building Footprint Area	200 ft x 100 ft
Total Building Footprint Area	20,000 ft^2
Proposed Land Usage	Residential and Commercial
Proposal Building Type	3 to 4 stories wood frame with podium parking
Anticipated Building Column Loads	>250 kips

RETAIL:



Parcel Size	3.0 Acres
Assumed Typical Building Footprint Area	100ft x100 ft
Total Building Footprint Area	10,000 ft^2
Proposed Land Usage	Commercial
Two Proposal Building Types	1 story concrete tilt-up
	1 story steel frame
Anticipated Building Column Loads	< 100kips

STREETS:

Improvement Areas	19.6 Acres
Length of Improvements	17,000 ft
Width of Improvements	40 feet
Proposed Land Usage	Public

COST ASSUMPTIONS RELATED TO LAND IMPROVEMENT MITIGATION

MITIGATION ALTERNATIVES FOR LAND DEVELOPMENT	ESTIMATED COSTS
Soil Import	$5/ cu. yds
Soil Removal and Rolling	$2/ cu. yds
Wick Drains and Installation	$0.57/ foot
Strip Drains and Installation	$1.30/ foot
Light-Weight Aggregate	$30/ cu. yds
GeoFoam	$57/ cu. yds
Soft Soil Removal and On-Site Haul	$4/ cu. yds

MITIGATION AND FOUNDATION ALTERNATIVES FOR NORTH MARE ISLAND DEVELOPMENT

(Dollar per Square Foot of Building Footprint)

ALTERNATIVE NUMBER	ALTERNATIVE NAME	FOUNDATION TYPE	LAND DEVELOPMENT MITIGATION	MIXED-USE	OFFICE/R&D	LIGHT INDUSTRIAL	RETAIL
1	F	Spread Footing	No Added Fill or Surcharge				$9 ($1)
2	S-F	Spread Footing	Surcharge Settlement Program			$15 ($7)	$15 ($7)
3	SW-F	Spread Footing	Surcharge Settlement Program with Wick Drains			$17 ($9)	$17 ($9)
4	S-M	Structural Mat	Surcharge Settlement Program	$19-$34 ($7)	$19-$34 ($7)	$19-$34 ($7)	$19-$34 ($7)
5	SW-M	Structural Mat	Surcharge Settlement Program with Wick Drains	$21-$36 ($9)	$21-$36 ($9)	$21-$36 ($9)	$21-$36 ($9)
6	PC	Piles	No Added Fill or Surcharge	$25-$31 ($1)	$25-$31 ($1)	$25-$31 ($1)	$25-$31 ($1)
7	S-PC	Piles	Surcharge Settlement Program	$31-$37 ($7)	$31-$37 ($7)	$31-$37 ($7)	$31-$37 ($7)
8	SW-PC	Piles	Surcharge Settlement Program with Wick Drains	$33-$39 ($9)	$33-$39 ($9)	$33-$39 ($9)*	$33-$39 ($9)*
9	S-GP-F	Spread Footing	Surcharge Settlement Program with Geo Piers			$25 ($13)	
10	S-PC-F	Piles and Footings	Surcharge Settlement Program			$27 ($7)	
11	SW-PC-F	Piles and Footings	Surcharge Settlement Program with Wick Drains			$29 ($9)	
12	LF-M	Structural Mat	Light-weight Fill	$32-$47 ($20)	$32-$47 ($20)	$32-$47 ($20)	$32-$47 ($20)

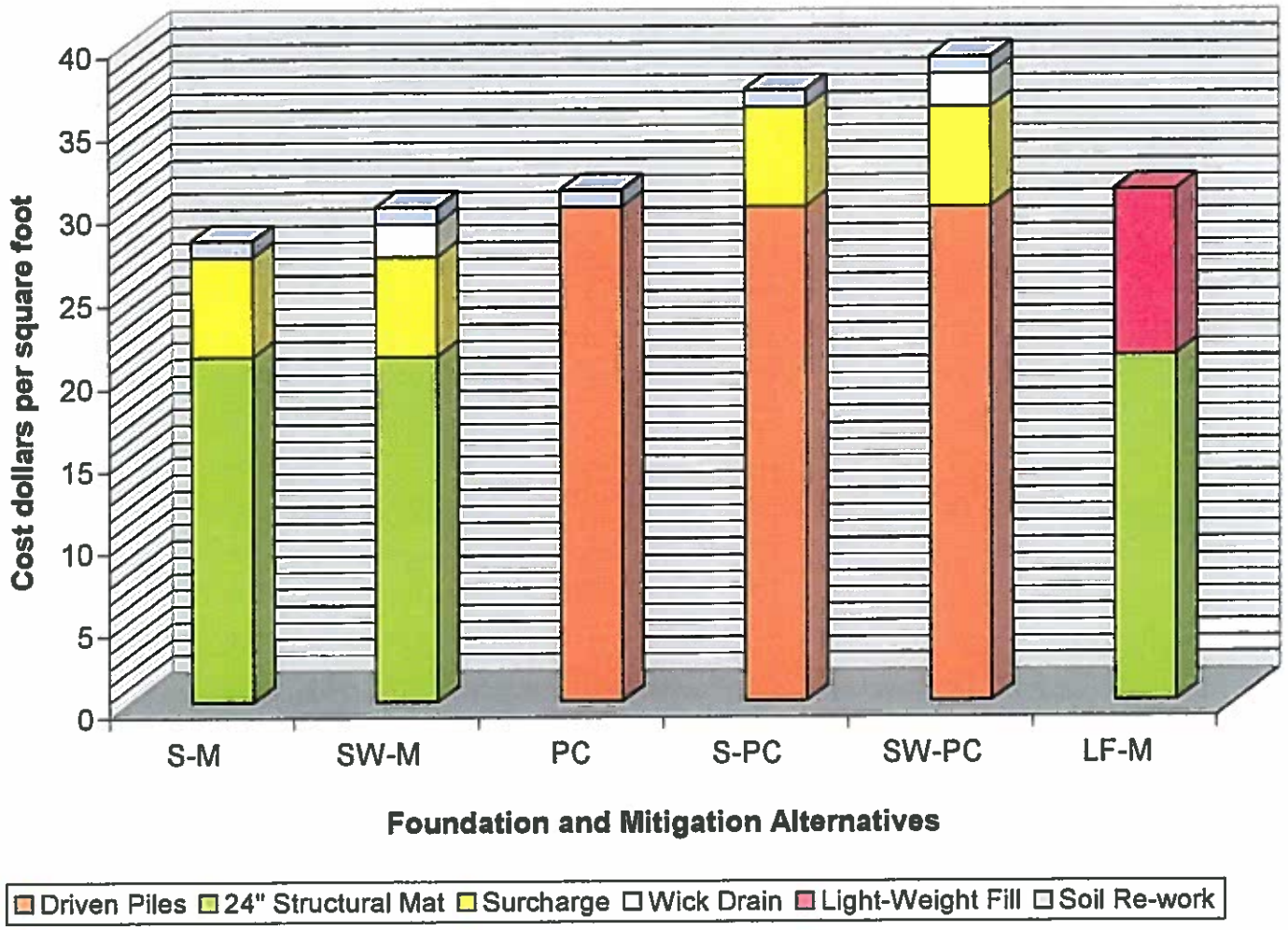
Explanation:

I. *$32-$47 ($20): Cost per square foot of building footprint (Cost of land mitigation)*

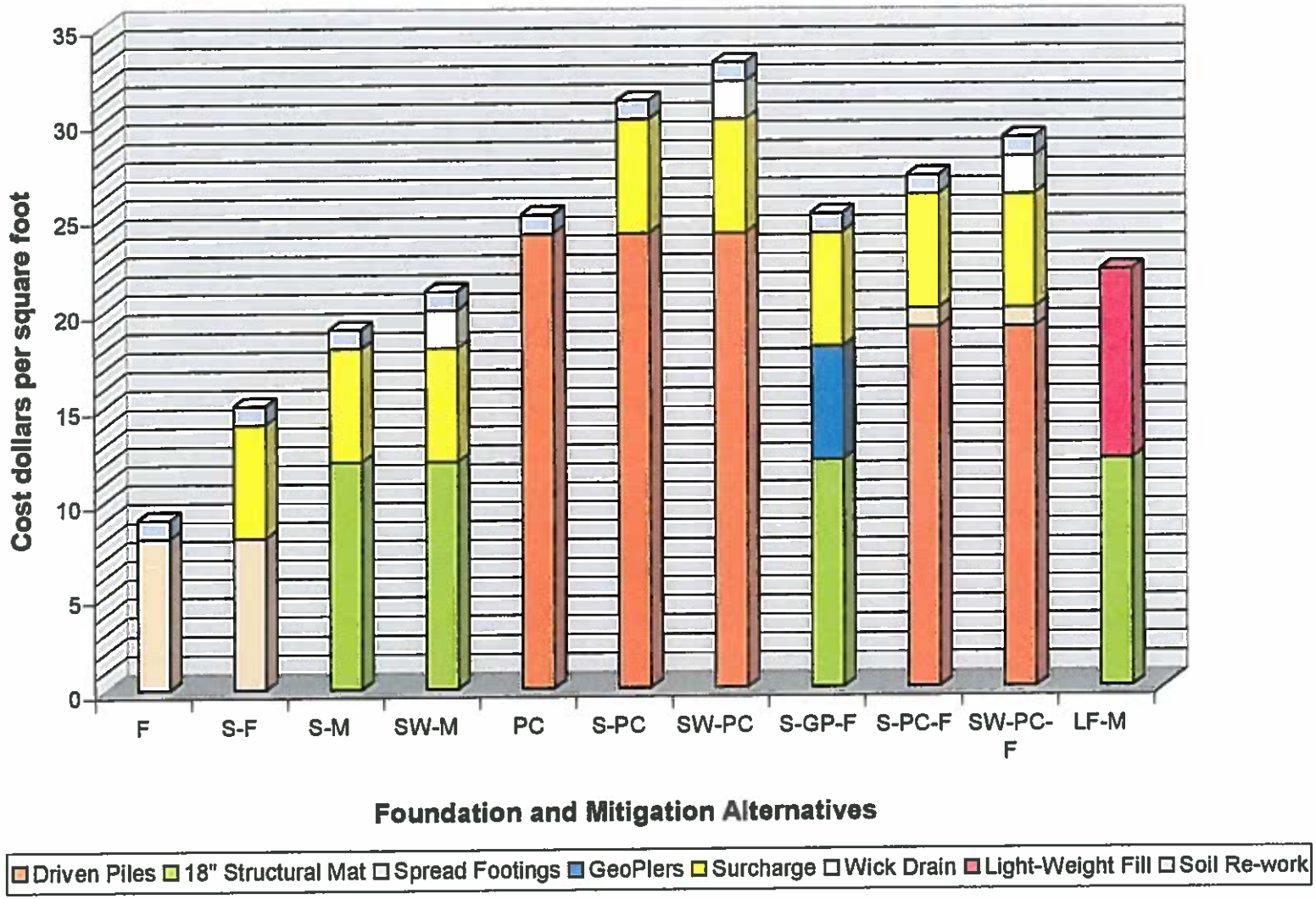
II. *Preferred alternatives considering cost and applicable foundations.*

III. *May not be applicable foundation system depending on proposed building type and site soils.*

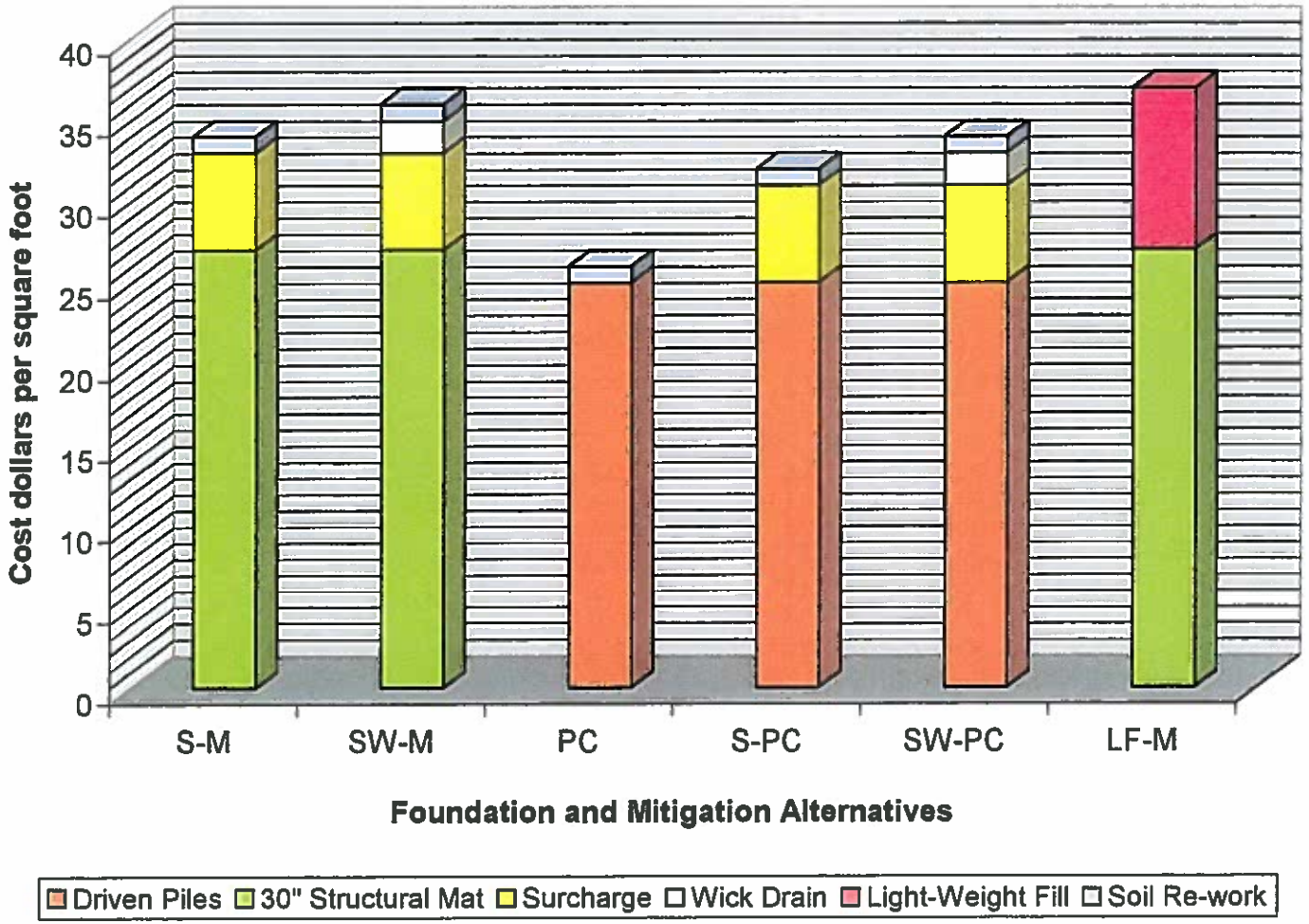
COST COMPARISON OF FOUNDATION ALTERNATIVES FOR OFFICE & R&D PARCEL



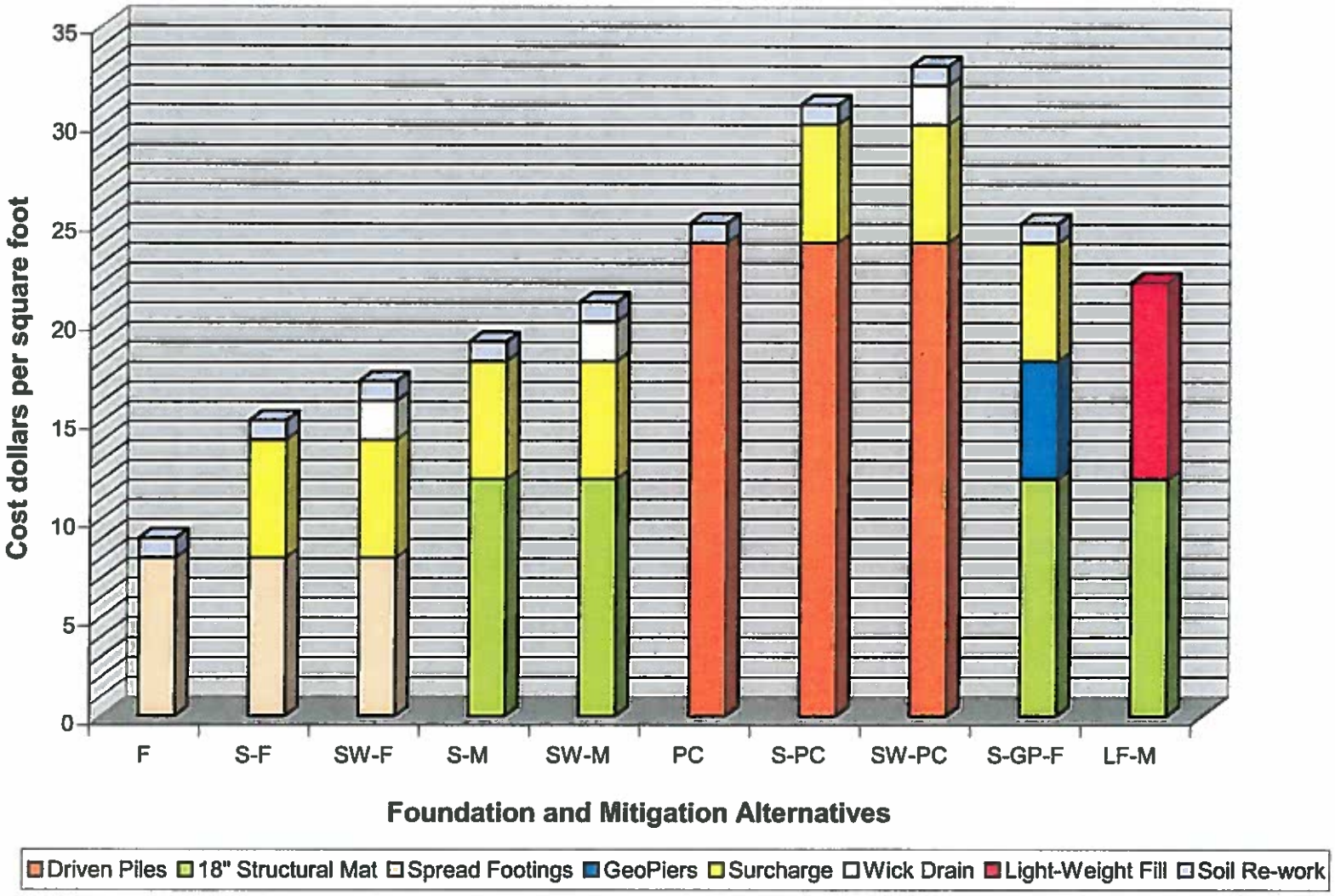
COST COMPARISON OF FOUNDATION ALTERNATIVES FOR INDUSTRIAL PARCEL



COST COMPARISON OF FOUNDATION ALTERNATIVES FOR MIXED-USED PARCEL



COST COMPARISON OF FOUNDATION ALTERNATIVES FOR RETAIL PARCEL



1. ALTERNATIVE F

Assumptions:

Bay Mud Thickness = **20 to 30 feet**
Building column load = **< 100kips**
Design Fill thickness = **Nil**

Foundation Mitigation	Spread footings
	Assume reworking fill within top 4 feet
Advantage	Only suitable for light weight structures
Disadvantage	Might not be applicable due to low bearing pressure of compressible soils
Land Development Cost	$1/ square foot of building footprint for reworking of surficial material
Foundation Construction Cost	$8/ square foot of building footprint for spread footing with floor
Total Cost	**$9/ square foot of building footprint**

2. ALTERNATIVE S-F

Assumptions:

Bay Mud Thickness = **20 to 45 feet**
Building column load = **< 100kips**
Design Fill thickness = **3 to 5 feet**

Foundation Mitigation	Spread footings
	Surcharge settlement program within 20-feet of the building footprint for design fill and structural load. Assumes a 10-foot surcharge fill over a 2-year time frame.
	Assume reworking fill within top 4 feet
Advantage	Minimize post-construction settlement
Disadvantage	Lengthy surcharge settlement program for consolidation of compressible soil under anticipated building load.
Land Development Cost	$1/ square foot of building footprint for reworking of surficial material
	$6/square foot of building footprint for a 10-foot-high surcharge settlement program
Foundation Construction Cost	$8/ square foot of building footprint for spread footing with floor
Total Cost	**$15/ square foot of building footprint**

3. ALTERNATIVE SW-F

Assumptions:

Bay Mud Thickness = **20 to 45 feet**
Building column load = **< 100kips**
Design Fill thickness = **3 to 5 feet**

Foundation Mitigation	Spread footings
	Surcharge settlement program within 20-feet of the building footprint for design fill and structural load. Assumes a 10-foot surcharge fill over a 6 months time frame.
	Wick Drain to facilitate surcharge settlement program with 7 foot spacing
	Assume rework fill within top 4 feet
Advantage	Minimize post-construction settlement
	Reduce time of surcharge settlement program
Disadvantage	Time for surcharge settlement program and consolidate compressible soil under anticipated building load.
Land Development Cost	$1/ square foot of building footprint for reworking of surficial material
	$2/ square foot of building footprint for wick drains and strip drain spaced at 7 feet apart within surcharge settlement program of compressible soils
	$6/ square foot of building footprint for 10-foot-high surcharge settlement program
Foundation Construction Cost	$8/ square foot of building footprint for 18" structural mat with #6 or #7 reinforcement
Total Cost	**$17/ square foot of building footprint**

4. ALTERNATIVE S-M

Assumptions:

Bay Mud Thickness – **20 to 45 feet**
Building column load – **< 270kips**
Design Fill thickness – **< 5 feet**

Foundation Mitigation	Structural mat with steel reinforcement
	Surcharge settlement program within 20-feet of the building footprint for design fill and structural load. Assumes a 10-foot surcharge fill over a 2 to 3 years time frame.
	Assume reworking fill within top 4 feet
Advantage	Minimize post-construction settlement
Disadvantage	Lengthy surcharge settlement program for consolidation of compressible soil under anticipated building load.
Land Development Cost	$1/ square foot of building footprint for reworking of surficial material
	$6/square foot of building footprint for a 10-foot-high surcharge settlement program
Foundation Construction Cost	$12-$27/ square foot of building footprint for 18" to 30" structural mat with #6 or #7 reinforcement
Total Cost	**$19-$34/ square foot of building footprint**

5. ALTERNATIVE SW-M

Assumptions:

Bay Mud Thickness – **20 to 45 feet**
Building column load – **< 270kips**
Design Fill thickness – **< 5 feet**

Foundation Mitigation	Structural mat with steel reinforcement
	Surcharge settlement program within 20-feet of the building footprint for design fill and structural load. Assumes a 10-foot surcharge fill over a 3 to 6 months time frame.
	Wick Drain to facilitate surcharge settlement program with 7 foot spacing
	Assume rework fill within top 4 feet
Advantage	Minimize post-construction settlement
	Reduce surcharge height
	Reduce time of surcharge settlement program
Disadvantage	Time for surcharge settlement program and consolidate compressible soil under anticipated building load.
Land Development Cost	$1/ square foot of building footprint for reworking of surficial material
	$2/ square foot of building footprint for wick drains and strip drain spaced at 7 feet apart within surcharge settlement program of compressible soils
	$6/square foot of building footprint for a 10-foot-high surcharge settlement program
Foundation Construction Cost	$12-$27/ square foot of building footprint for 18" to 30" structural mat with #6 or #7 reinforcement
Total Cost	**$21-$36/ square foot of building footprint**

6. ALTERNATIVE PC

Assumptions:

Bay Mud Thickness – **20 to 30 feet**
Building column load – **< 270kips**
Design Fill thickness – **Nil**

Foundation Mitigation	Support structure on driven piles
	Assume rework fill within top 4 feet
Advantage	Minimize structural deformation due to differential settlement
	Minimal site preparation or mitigation
Disadvantage	Possible differential settlements between building and external utilities depending on traffic load
	Possible differential settlements between building and secondary slab on grade
	Minor down drag force acting on the pile causing settlement of foundation due to minor design fill loads or shallow adjacent improvements.
Land Development Cost	$1/ square foot of building footprint for reworking of surficial material
Foundation Construction Cost	$24-$30/ square foot of building footprint for a pile length of 50 to 60 feet (12" to 14" square reinforced concrete pile with 18" floor slab)
Total Cost	**$25-$31/ square foot of building footprint**

7. ALTERNATIVE S-PC

Assumptions:

Bay Mud Thickness – **20 to 45 feet**
Building column load – **< 270kips**
Design Fill thickness – **< 5 feet**

Foundation Mitigation	Support structure on driven piles
	Surcharge settlement program within 20-feet of the building footprint for design fill load. Assumes a 10-foot surcharge fill over a 1 to 2 years time frame.
	Assume rework fill within top 4 feet
Advantage	Minimize structural deformation due to differential settlement
	Minimal site preparation or mitigation
Disadvantage	Possible differential settlements between building and external utilities depending on design fill loads
	Possible differential settlements between building and secondary slab-on-grade
Land Development Cost	$1/ square foot of building footprint for reworking of surficial material
	$6/ square foot of building footprint for 10-foot high surcharge settlement program
Foundation Construction Cost	$24-$30/ square foot of building footprint for a pile length of 50 to 60 feet (12" to 14" square reinforced concrete pile with 18" floor slab)
Total Cost	**$31-$37/ square foot of building footprint**

8. ALTERNATIVE SW-PC

Assumptions:

Bay Mud Thickness – **20 to 45 feet**
Building column load – **< 270kips**
Design Fill thickness – **< 5 feet**

Foundation Mitigation	Support structure on driven piles
	Wick Drains spaced 7 feet apart
	Surcharge settlement program within 20-feet of the building footprint for design fill load. Assumes a 10-foot surcharge fill over a 3 to 6 months time frame.
	Assume rework fill within top 4 feet
Advantage	Reduce time of surcharge settlement program
	Minimize structural deformation due to differential settlement
	Minimal site preparation or mitigation
Disadvantage	Possible differential settlements between building and external utilities depending on design fill loads
	Possible differential settlements between building and secondary slab-on-grade
Land Development Cost	$1/ square foot of building footprint for reworking of surficial material
	$2/ square foot of building footprint for wick drains and strip drain spaced at 7 feet apart
	$6/ square foot of building footprint for 10-foot high surcharge settlement program
Foundation Construction Cost	$24-$30/ square foot of building footprint for a pile length of 50 to 60 feet (12" to 14" square reinforced concrete pile with 18" floor slab)
Total Cost	**$33-$39/ square foot of building footprint**

9. ALTERNATIVE S-GP-F

Assumptions:

Bay Mud Thickness = **20 to 45 feet**
Building column load = **< 100kips**
Design Fill thickness = **3 to 5 feet**

Foundation Mitigation	Impact GeoPiers
	Surcharge settlement program within 20-feet of the building footprint for design fill load. Assumes a 10-foot surcharge fill over a 6 months time frame.
	Spread footing and slab on grade foundation
	Assume rework fill within top 4 feet
Advantage	Minimize time for surcharging due to GeoPiers acting as wick drains to facilitate surcharge settlement program
	Minimal differential settlement for slab and footing
	Shallow depth of piers
Disadvantage	Not able to account for down drag load
	Potential effect on adjacent existing structures during vibration of piers
Land Development Cost	$1/ square foot of building footprint for reworking of surficial material
	$6/ square foot of building footprint for 10-foot-high surcharge settlement program
	$6/ square foot of building footprint for GeoPiers
Foundation Construction Cost	$12/ square foot of building footprint for slab and footings
Total Cost	**$25/ square foot of building footprint**

10. ALTERNATIVE S-PC-F

Assumptions:

Bay Mud Thickness – **20 to 45 feet**
Building column load – **< 100kips**
Design Fill thickness – **3 to 5 feet**

Foundation Mitigation	Support perimeter walls on driven piles
	Spread footings for interior columns
	Surcharge settlement program within 20-feet of the building footprint for design fill load. Assumes a 10-foot surcharge fill over a 2 to 3 years time frame.
	Assume rework fill within top 4 feet
Advantage	Minor site preparation or mitigation
Disadvantage	Can only be used for structures where interior differential settlements are more forgiving
	Possible differential settlements between building and external utilities ranging from 1 foot to 3 feet due to design fill.
	Differential settlements between walls and interior columns
Land Development Cost	$1/ square foot of building footprint for reworking of surficial material
	$6/ square foot of building footprint for 10-foot high surcharge settlement program
Foundation Construction Cost	$19/ square foot of building footprint for a pile with slab
	$1/ square foot of building footprint for interior footing
Total Cost	**$27/ square foot of building footprint**

11. ALTERNATIVE SW-PC-F

Assumptions:

Bay Mud Thickness – **20 to 45 feet**
Building column load – **<100kips**
Design Fill thickness – **3 to 5 feet**

Foundation Mitigation	Support perimeter walls on driven piles
	Spread footings for interior columns
	Surcharge settlement program within 20-feet of the building footprint. Assumes a 10-foot surcharge fill over a 3 to 6 months time frame.
	Wick Drain to facilitate surcharge settlement program with 7 foot spacing
	Assume rework fill within top 4 feet
Advantage	Minimal site preparation or mitigation
	Reduce time of surcharge settlement program
Disadvantage	Can only be used for structures where interior differential settlements are more forgiving
	Possible differential settlements between building and external utilities ranging from 1 foot to 3 feet due to design fill.
	Differential settlements between walls and interior columns
Land Development Cost	$1/ square foot of building footprint for reworking of surficial material
	$6/ square foot of building footprint for 10-foot high surcharge settlement program
	$2/ square foot of building footprint for wick drains and strip drain spaced at 7 feet apart within surcharge settlement program of compressible soils
Foundation Construction Cost	$19/ square foot of building footprint for pile and slab
	$1/ square foot of building footprint for interior footing
Total Cost	**$29/ square foot of building footprint**

12. ALTERNATIVE LF-M

Assumptions:

Bay Mud Thickness – **20 to 45 feet**
Building column load – **< 270kips**
Design Fill thickness – **< 5 feet**

Foundation Mitigation	Structural mat with steel reinforcement
	Use lightweight fill material (50pcf) to achieve design grade
	Remove top 5 feet of existing fill and replace with light weight fill material
Advantage	Reduce time for site preparation before construction
	Minimize structure deformation due to differential settlement
Disadvantage	Possible need for bridging soft compressible soils exposed in excavation
	Off-haul/ blending excavated material
	Dewatering during excavation
	Possible minor post-construction settlement
Land Development Cost	$20/ square foot of building footprint for replacement with lightweight fill down to 5 feet
Foundation Construction Cost	$12-$27/ square foot of building footprint for 18" to 30" structural mat with #6 or #7reinforcement
Total Cost	**$32-$47/ square foot of building footprint**

MITIGATION FOR ROADS AND UTILITES FOR NORTH MARE ISLAND IMPROVEMENTS

(Dollar per Lineal Foot of Street)

ALTERNATIVES	LAND DEVELOPMENT MITIGATION	IMPROVEMENTS*
S	Surcharge Settlement Program	$78/ lineal foot
SW	Surcharge Settlement Program with Wick Drain	$129/ lineal foot
GF	Remove and Replace with GeoFoam	$102/ lineal foot
LF	Remove and Replace with Light-Weight Aggregate	$112/ lineal foot
P-G	Piles with Grade Beams to Support Utilities	$224/ lineal foot

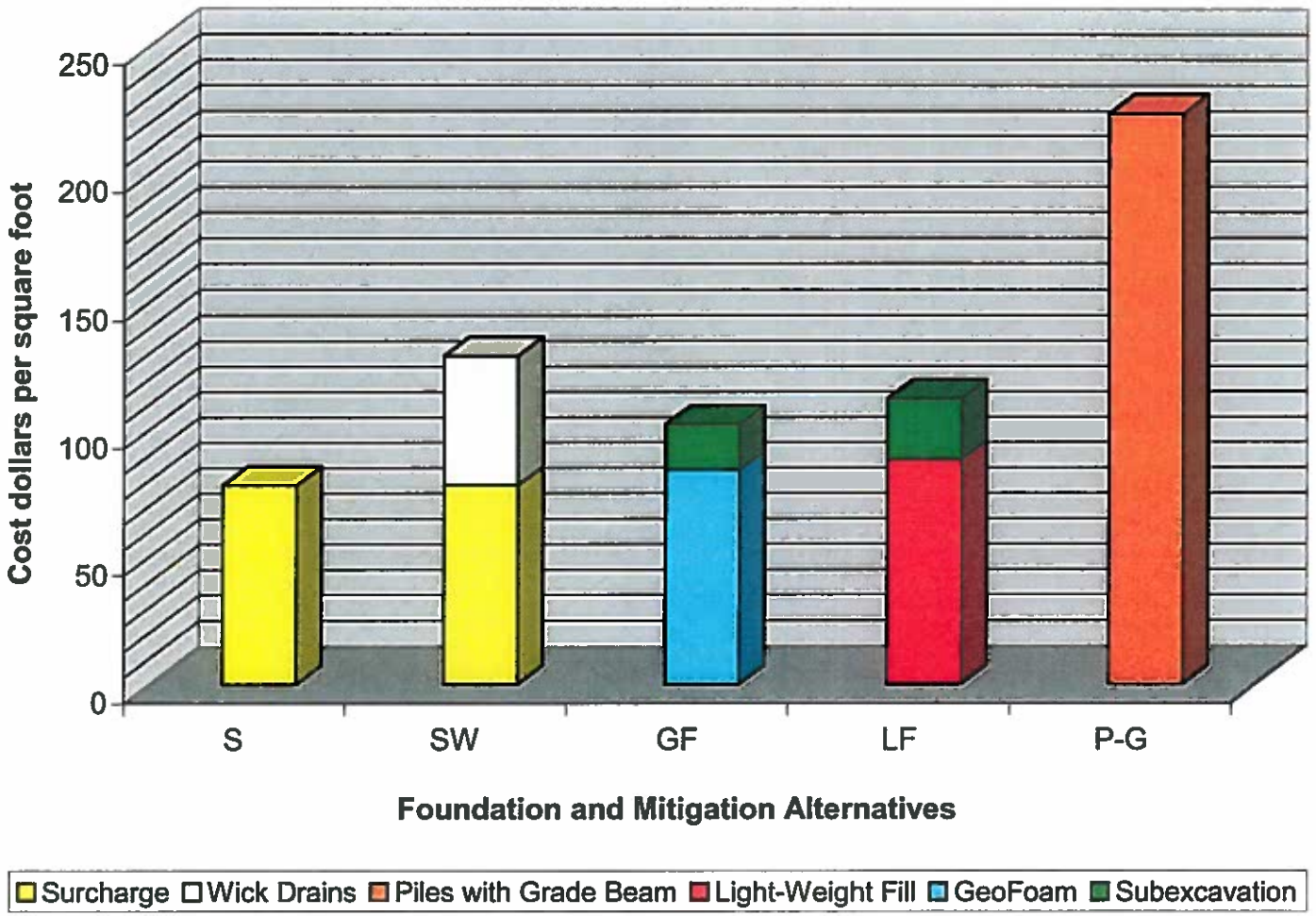
Does not include installation and material cost for site improvements and assumes a 40 feet wide road section constructed on current road elevations.

Explanation:

I. *$32-$47 ($20): Cost per square foot of building footprint (Cost of land mitigation)*

II. [ ] *Preferred alternatives considering cost and applicable foundations.*

COST COMPARISON OF MITIGATIONS FOR IMPROVEMENTS AND STREETS



ALTERNATIVE S

Mitigation	Surcharge road areas with 5 feet of surcharge fill for anticipated traffic load
Advantage	Minimize settlement of pavement
	Minimize settlement due to load of utilities
Disadvantage	Import material for surcharge settlement program
	Temporary road closure for surcharge settlement program.
Cost	$78 per lineal foot of street to be surcharge
Total Cost	**$78 per lineal foot of street to be surcharge settlement**

ALTERNATIVE SW

Mitigation	Surcharge road areas with 5 feet of surcharge fill for anticipated traffic load
	Wick drain to facilitate surcharge settlement program with 7 foot spacing
Advantage	Reduce time of surcharge settlement program
	Minimize settlement of pavement
	Minimize settlement due to load of utilities
Disadvantage	Import material for surcharge settlement program
	Temporary road closure for surcharge settlement program.
Cost	$51 per lineal foot of street to be wick drained
	$78 per lineal foot of street to be surcharge
Total Cost	**$129 per lineal foot of street to be surcharge settlement**

ALTERNATIVE GF

Mitigation	Remove 1 feet of soil under roadway subgrade
	Replace with GeoFoam material (1pcf)
Advantage	Minimize settlement of pavement
	Minimize settlement due to load of utilities
	Easy to work with
Disadvantage	May not be used in hydrocarbon contaminated areas.
	Off-haul excavated fill
	Import GeoFoam material
	Utilities laterals may have minor differential settlement
Cost	$84 per lineal foot of street for replacement with GeoFoam
	$18 per lineal foot of street to be subexcavated
Total Cost	**$102 per lineal foot of street for remove and replace with GeoFoam**

ALTERNATIVE LF

Mitigation	Remove 2 feet of soil under roadway subgrade
	Replace with lightweight fill material (50pcf)
Advantage	Minimize settlement of pavement
	Minimize settlement due to load of utilities
Disadvantage	Off-haul excavated fill
	Import lightweight material
	Utilities laterals may have minor differential settlement
Cost	$88 per lineal foot of street for light-weight aggregate
	$24 per lineal foot of street to be subexcavated
Total Cost	**$112 per lineal foot of street for remove and replace with light weight fill**

ALTERNATIVE P-G

Mitigation	Support critical utilities on piles with grade beam and slab
Advantage	Minimize post-construction differential settlement of the system
Disadvantage	Down drag force from Bay Mud might cause differential settlement
	Utilities laterals may have minor differential settlement
Cost	$224 per lineal foot of street for 20 feet piles spaced 8 feet apart
Total Cost	**$224 per lineal foot of street for 20 feet piles spaced 8 feet apart**