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CORRECTIONAL SERVICES CANADA

S4 Living Unit
Warkworth Institution

Value Management Workshop Report

Volume II- Value Analysis Proposals

HV
8829
.C2
H3
1985
v.2
c.2

nscomb
wa, Ontario

October 1985

HV
8829
C2
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1985
V. 2
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VALUE MANAGEMENT REPORT:

WARKWORTH PROJECT

VOLUME 2 OF 2

VALUE ANALYSIS PROPOSALS

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DRAFT

For discussion purposes only

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October 1985

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TABLE OF CONTENTS

VOLUME 1 - VALUE ANALYSIS PROPOSALS

INTRODUCTION

1. **SUMMARY OF VALUE ANALYSIS PROPOSALS (VAP)**
2. **ARCHITECTURAL VAP**
3. **STRUCTURAL VAP**
4. **MECHANICAL VAP**
5. **ELECTRICAL VAP**
6. **SPACE PLANNING/CONCEPT SUGGESTIONS**

APPENDICES

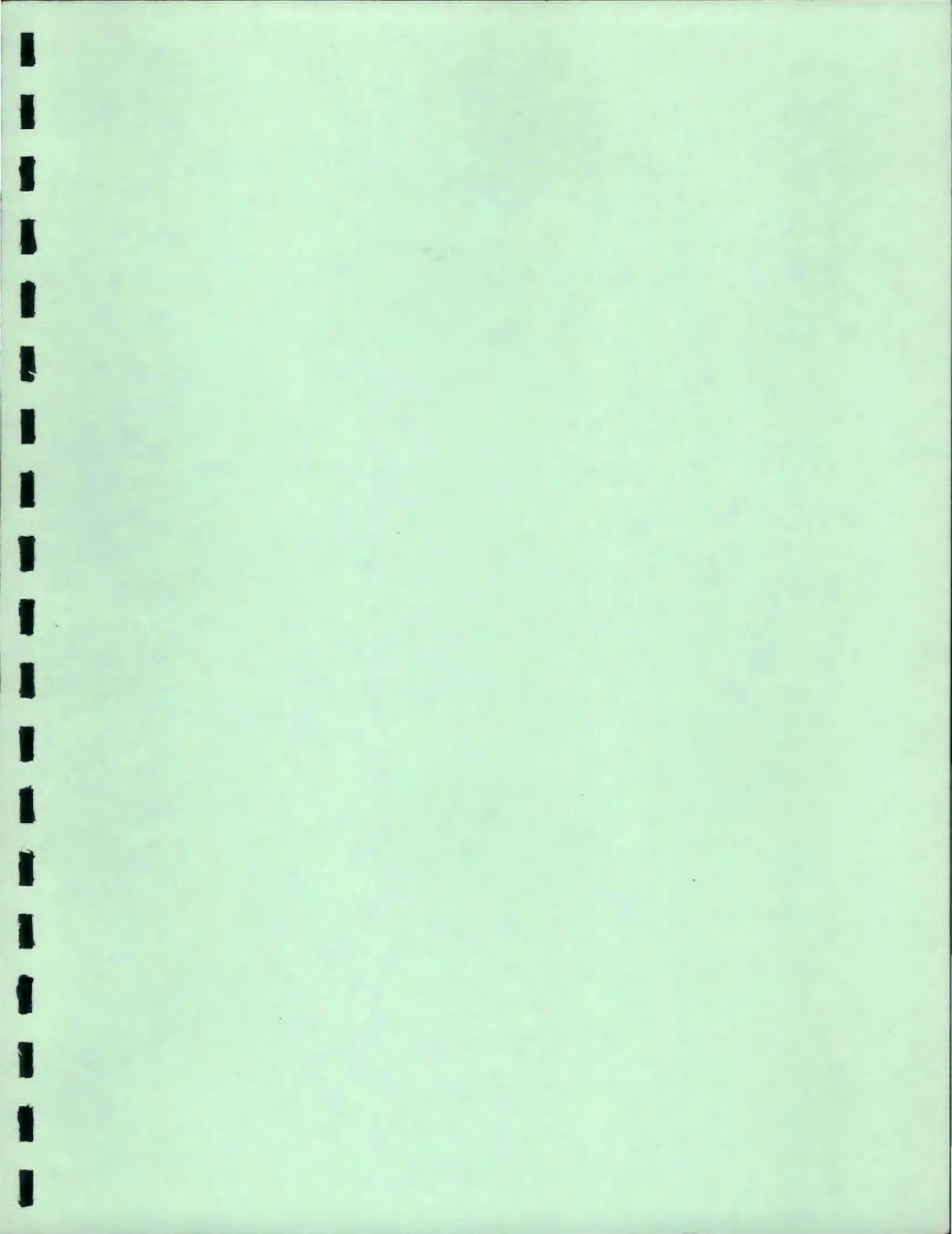
- A - **PROJECT ESTIMATE SUMMARY**
- B - **PLANS, ELEVATIONS AND SECTIONS**



INTRODUCTION

This is the second of a two volume Value Management report prepared for the Warkworth Institution S4 Living Unit. It contains all the Value Analysis Proposals (VAP) with supporting information referred to in Volume 1, as well as a project estimate summary, and plans, elevations and sections that are to be found in the Appendices.

1. **SUMMARY OF VALUE ANALYSIS
PROPOSALS (VAP)**



4.3.1 Overall Summary of Value Analysis Proposals (VAP) -
Potential Savings

Classification	A	B	C	Total
1	192,785	431,000	17,000	640,785
2	192,085	326,500	27,500	546,085
3	18,190	14,000	--	32,190
Total	403,060	771,500	44,500	1,219,060

- Notes: 1) See 4.2 for classifications.
- 2) Life cycle cost savings reported total \$195,370.
- 3) Total estimated construction cost \$3,809,689. (as shown in summaries).

4.3.2 Summary of Architectural VAP - Potential Savings

Classification	A	B	C	Total
1	102,300	339,500	17,000	458,800
2	104,400	142,500	--	246,900
3	8,190	8,000	--	16,190
Total	214,890	490,000	17,000	721,890

Notes: 1) See 4.2 for classifications.

2) Life cycle cost savings reported total \$71,600.

3) Total estimated construction cost \$2,103,634.

4.3.3 Summary of Structural VAP - Potential Savings

Classification	A	B	C	Total
1	28,930	49,000	--	77,930
2	10,000	--	--	10,000
3	--	--	--	--
Total	38,930	49,000	--	87,930

Notes: 1) See 4.2 for classifications.

2) Total estimated construction cost \$451,425.

4.3.4 Summary of Mechanical VAP - Potential Savings

Classification	A	B	C	Total
1	21,250	43,000	--	64,250
2	5,000	169,000	--	174,000
3	10,000	6,000	--	16,000
Total	36,250	218,000	--	254,250

Notes: 1) See 4.2 for classifications.

2) Life cycle costing savings reported total \$57,000.

3) Total estimated construction cost:

Building: \$778,275.

Site: \$ 55,955.

Total: \$834,230.

4.3.5 Summary of Electrical VAP - Potential Savings

Classification	A	B	C	Total
1	40,305	--	--	40,305
2	72,685	15,000	27,900	115,585
3	--	--	--	--
Total	112,990	15,000	27,900	155,890

Notes: 1) See 4.2 for classifications.

2) Life cycle costing savings reported total \$66,770.

3) Total estimated construction cost:

Building: \$335,400.

Site: \$ 85,000.

Total: \$420,400.

2. ARCHITECTURAL VAP



SUMMARY OF VALUE ANALYSIS PROPOSALS

Section: SUMMARY OF ARCHITECTURAL VAP

VAP No.	V A P	Baseline Value	Savings (Increase)		Class
			Capital	O&M(PV)	
	Roofing				
A1	Omit concrete toppings and add tapered insulation.	132,000	39,000	--	B1
A2	Omit concrete pavers.	3,000	2,000	--	A1
A3	Roof drainage.	See VAP M.13			
	External Walls				
A4	Alternates for outer skin:	240,000	--	--	--
	1. Outsulation	--	*4,500	--	B3
	2. Stucco	--	8,000	--	B3
	3. Metal siding	--	(38,000)	--	--
	4. Precast with cell window built-in	--	(4,400)	--	--
A5	Omit additional wall skin for end cells.	*6,700	5,000	--	B1
A6	Substitute fibreglass insulation for rigid polystyrene.	*36,000	4,300	--	A1
	Window Cells				
A7	Substitute interglazed bars, tempered glass and alarm.	*195,000	54,000	--	C1
A8	Change shape and size of window to slot opening.	269,000	164,300	--	B1
A9	Omit architectural surround.	*74,000	*64,000	--	B2
	Windows - Other than Cells				
A10	Substitute interglazing, 6 mm tempered glass and alarm.	75,000	14,000	--	C1
A11	Reduce size by 50% - use slot windows with tempered glass.	*38,000	*19,000	--	B1
A12	Omit architectural surround - build in direct to masonry.	*73,700	30,000	--	B2

A - Accepted, P - Pending, R - Rejected



SUMMARY OF VALUE ANALYSIS PROPOSALS

Section: SUMMARY OF ARCHITECTURAL VAP

VAP No.	V A P	Baseline Value	Savings (Increase)		Class
			Capital	O&M(PV)	
	External Staircases				
A13	Omit staircase & roof - add berming & single flight stair.	62,680	48,000	--	A2
	Other Staircases				
A14	Omit four internal stairs & relocate exterior stairs.	23,000	10,700	--	B1
A15	Relocate inside stairs to mechanical room outside.	3,350	1,300	--	B1
	Internal Walls				
A16	Substitute drywall for glass smoke baffles.	36,000	8,400	--	A2
A17	Substitute 150 mm solid block to non cell interior walls.	*170,000	*18,000	--	A2
A18	Substitute 150 mm solid concrete block for security walling in lieu of 200 mm H blocks (all walls).	170,000	89,200	--	B2
A19	Substitute 150 mm H blocks walls between cells for 200 mm.	*111,000	*24,900	--	B2
A20	Use conventional steel frames for screens - delete in multi-purpose rooms.	36,000	20,000	--	A2
A21	Use pre-engineered cell utility core.	*296,000	*(48,000)	71,600	A3
	Cell Doors				
A22	Cell doors:	403,000	--	--	--
	1. Electric beak lock	--	76,000	--	A1
	2. Omit requirement for model	--	8,000	--	A1
	3. Omit requirement for spares	--	12,000	--	A1
	4. Standardize configuration	--	3,000	--	C1
	5. Reduce door height & building height	--	30,000	--	B1
	6. Omit gang release override mechanism	--	24,000	--	A2

A - Accepted, P - Pending, R - Rejected



SUMMARY OF VALUE ANALYSIS PROPOSALS

Section: SUMMARY OF ARCHITECTURAL VAP

VAP No.	V A P	Baseline Value	Savings (Increase)		Class
			Capital	O&M(PV)	
	Finishes				
A23	Fibreglass bulkhead:	130,000	--	--	--
	1. Fix bulkhead to door track	--	*8,000	--	A1
	2. Substitute drywall	--	*116,600	(16,500)	B2
	3. Substitute drywall & plywood	--	112,500	(21,200)	B2
	4. Substitute light gauge steel	--	*85,500	(4,500)	B1
	5. Omit bulkhead and fix lights to duct shaft wall.	--	*120,000	(19,800)	B3
	6. Substitute Granex board.	--	*86,980	(17,590)	B1
A24	Wall tiling:	9,755	--	--	--
	1. Substitute 100 mm X 100 mm tiles for ceramic mosaic	--	*2,155	--	A1
	2. Substitute epoxy paint for ceramics	--	6,900	--	A3
A25	Substitute sheet vinyl flooring for quarry tiles.	2,250	1,290	--	A3
A26	Omit suspended drywall ceiling in dayrooms.	5,000	4,000	--	A2
	Totals (* not included)	\$1,600,035	\$721,890	\$71,600	

A - Accepted, P - Pending, R - Rejected



Subject: ARCHITECTURAL

VAP No.: A1

Item: ROOF FINISH

Date:

Revision:

Related Proposals S7.2	Baseline Value \$ 132,000	Savings	
		Capital LCC	Energy O & M

Baseline:

Inverted two ply modified asphalt roofing on 100mm rigid insulation on concrete topping (laid to falls to provide roof drainage).

Proposed:

Traditionally arrange two ply modified asphalt roofing or single layer elastomeric roofing on sloped rigid insulation.

Advantages

Disadvantages

Cost reduction in parapet height.

May require small amount of extra maintenance.

Additional savings in precast of slabs.

Savings

Capital Cost: \$39,000

Life Cycle Cost: --

Classification: B1

			QUANTITY	RATE	\$
		ROOF FINISH		B/F	
		<u>OMMISSIONS</u>			
		TWO PLY MODIFIED ASPHALT ROOFING MEMBRANE ROOFING SYSTEM.	1526m ²	60.00	(91560)
		INSITU CONCRETE TOPPING	1526m ²	20.00	(30520)
		PRECAST RAUING SLABS	95m ²	32.00	(3150)
		PROPOSAL			
		SINGLE PLY BALLOUED MEMBRANE ON SLOPED INSULATION	1526	60.00	91560
		REDUCED PARAPET HEIGHT.	32m ²	175.00	5600
		TOTAL	SAVINGS		39270
				C/F	



Subject: ARCHITECTURAL

VAP No.: A2

Item: CONCRETE PAVERS

Date: _____

Revision: _____

Related Proposals	Baseline Value \$ 3,000	Savings	
		Capital	Energy
		LCC	O & M

Baseline:

Single concrete pavers clustered at corners to weight down roofing.

Proposed:

Additional layer of roofing in small area or asphalt tile.

Advantages

Cost reduction.

Disadvantages

Minimal increase in wear from foot traffic.

Savings

Capital Cost: \$2,000

Life Cycle Cost: --

Classification: AI



Subject: ARCHITECTURAL

VAP No.: A3

Item: ROOF DRAINAGE (see VAP M13)

Date:

Revision:

Related Proposals	Baseline Value \$ 28,000	Savings	
		Capital	Energy
		LCC	O & M

Baseline:

Twenty one cast iron drain pipes with clean outs and insulation.

Proposed:

1. Relocate roof drains to correspond with vertical ducts.
2. Omit roof down pipes and provide scuppers.

Advantages

Disadvantages

Cost reduction.

Pattern staining exterior.

Reduced maintenance.

Some ponding.

Reduced mechanical space requirement.

Savings

Capital Cost: --

Life Cycle Cost: --

Classification: --



Subject: ARCHITECTURAL

VAP No.: A4

Item: EXTERIOR WALLS - OUTER SKIN

Date: _____

Revision: _____

Related Proposals	Baseline Value 240,000 \$	Savings	
		Capital LCC	Energy O & M

Baseline:

Architectural block wall 100 mm thick with precast architectural surrounds to openings.

Proposed:

1. An outsulation system incorporating rigid insulation, steel framing and an outer finish.
2. An outer skin of metal lath and stucco painted.
3. A prefinished (500 series) metal siding on girts.
4. Full height flexwall precast slab with cell windows built in at shop.

Advantages**Disadvantages**

Light weight (1, 2 & 3).

More easily damaged (1, 2 & 3).

Initially cheaper (1 & 2).

Will not support precast (1, 2 & 3).

Reduce site welding windows (4).

High maintenance cost (2).

Omits need for surrounds (4).

Higher capital cost (3 & 4).

Faster construction (4).

Savings (Increase)**Alternatives**

	1	2	3	4
Capital Cost:	4,500	8,000	(38,000)	(4,400)
Life Cycle Cost:	--	--	--	--
Classification:	B3	B3	--	--

	QUANTITY	RATE	\$	
<p>2. exterior Outside Arched Roof</p>				
<p>Unit Arched roof</p>				
<p>skin</p>	1572m ²	55 ⁰⁰		
<p>Vapor barrier</p>	1572m ²	5 ⁰⁰		
<p>Unit Nds on foundation</p>			6450	
<p>Unit Insulation</p>	1572m ²	85 ⁰⁰	133620	
			<u>140070</u>	
<p>Sub. Transition system complete including g-vented support system</p>	1572m ²	80 ⁰⁰	125760	
<p>Sub. Truss rafter g-vent</p>	828m	13 ⁰⁰	10764	
			136524	
			<u>(4500)</u>	

Stucco exterior IIT

QUANTITY

RATE

\$

Unit: Architectural block
 Increased area - Process

1431 m²

55⁰⁰

78705

Unit: Mill. ^{Surround}

141 m²

55⁰⁰

7755
 6450.

92910

Mill: Galvanized girt
 support

1572 m²

21⁵⁰

K. bath.

1572 m²

2⁵⁰

Stucco.

1572 m²

25⁰⁰

Paint

1572 m²

5⁰⁰

54⁰⁰

84888

8

8022

	QUANTITY	RATE	\$
71' x 100' x 2' concrete of architectural block			
Omit architectural block	1431 m ²	55 ⁰⁰	78705
Finish on same as previous	141 m ²	55	7755
Omit. NB on foundation.			6450
			<hr/>
			92910
			<hr/>
Add Metal siding with series 500 finish	1431 m ²	54 ⁰⁰	77774
	141 m ²	54 ⁰⁰	7614
Steel joints @ same.	1431 m ²	21 ⁵⁰	30766
	141 m ²	21 ⁵⁰	3032
Trimming around windows	745 m	15 ⁰⁰	11175
Dill down 75	83 m	15 ⁰⁰	1245
	83		
			<hr/>
			131,106
			<hr/>

Precast Exterior Panels	QUANTITY	RATE	\$
Onix Architect block	1431 m ²	55 ⁰⁰	78705
Insulation	1431 m ²	25 ⁰⁰	35775
Vapour barrier	1431 m ²	2 ⁵⁰	3577
Knit a foundation			6450
Precast panels summit			<u>114700</u>
			<u>239207</u>
Add Precast Flexwall	1695 m ²	130 ⁰⁰	220350
Anchors in slabs	479 m	20 ⁰⁰	9580
Additional foundation	356 m ²	49 ⁰⁰	17444
			<u>\$ 247376</u>
Exterior			8167
Savings in Indirects from reduced time 4 Days. 600			2400
Ditto CSC costs			1332
			<u>\$ 44355</u>



Subject: ARCHITECTURAL

VAP No.: A5

Item: EXTERIOR WALLS - END CELL ADDITIONAL
BLOCK SKIN

Date:

Revision:

Related Proposals	Baseline Value \$ 6,700	Savings	
		Capital LCC	Energy O & M

Baseline:

Architectural block insulation, vapour barrier, H type block inner skin, and 100 mm block.

Proposed:

Omit 100 mm block skin which is only introduced for dimensional reasons - add special steel ties for window cavity if required. See revised space layout proposals as this detail is redundant if end cells are relocated.

Advantages

Disadvantages

Reduce cost.
Reduce weight of structure.
Reduction - site time.

Wider cavity than is acceptable.
by code but code being reviewed at present time. It allows for additional thickness of insulation.

Savings

Capital Cost: \$5,000

Life Cycle Cost: --

Classification: B1

	QUANTITY	RATE	\$
Original concrete wall in end cell condition.			
1 mil asbestos 100 mil block shee	223 m ²	30 ⁰⁰	<u>6690.</u>
1/2" Mild steel plate	892 lb.	2 ⁰⁰	(1784)
		\$	4906
			5000



Subject: ARCHITECTURAL

VAP No.: A6

Item: EXTERIOR WALLS - FIBREGLASS INSULATION

Date:

Revision:

Related Proposals	Baseline Value \$ 36,000	Savings	
		Capital LCC	Energy O & M

Baseline:

Extruded polystyrene CASB 51-AP-20M 100 mm thick type 4S.

Proposed:

Fibreglass.

Advantages

Reduced cost.

Disadvantages

Nil

Savings

Capital Cost: \$4,300

Life Cycle Cost: --

Classification: A1

SUBSTITUTE FIBREGLASS INSULATION	QUANTITY	RATE	\$	
Omit Extruded Polystyrene	1431 m ²	25 ⁰⁰	35,775	
<u>Add</u> Fibreglass 4"	1431 m ²	22 ⁰⁰	31,482	
			<u>4293</u>	



Subject: ARCHITECTURAL

VAP No.: A7

Item: CELL WINDOWS - INTERGLAZE BARS WITH ALARM

Date: _____

Revision: _____

Related Proposals	Baseline Value 195,000 \$	Savings	
		Capital LCC	Energy O & M

Baseline:
 Security window units in precast surround vertical bars, anti saw rods, cement/epoxy filling, insulated aluminium vent cover, security and fly screens.

Proposed:
 Security window with interglazed horizontal bars, 6 mm tempered glass both sides, ultrasonic alarm on inside pane of glass - total glazed area = U.S.F.

Advantages	Disadvantages
Substantial cost reduction.	Security depends upon quick response to alarm system.
	Development and testing of prototype.

Savings

Capital Cost: \$54,000

Life Cycle Cost: --

Classification: C1

	QUANTITY	RATE	\$	
<u>OMMISSIONS</u>				
EXISTING CELL WINDOWS	80 NO	2000. ⁰⁰	(160 000 -)	
ARCHITECTURAL PRECAST SURROUNDS	80 NO	923.7 ⁰⁰	(73 900 -)	
<u>ADDITIONS</u>				
6MM TEMPERED GLASS	80 M ²	65. ⁰⁰	5200 -	
65 X 65 MM HOLLOW ROLLED STEEL SECTIONS IN INTER GLAZED BARS.	80 NO	150. ⁰⁰	12000 -	
EXTERNAL WALL CONSTRUCTION	37 M ²	175. ⁰⁰	6500 -	
16 GAUGE PRESSED METAL FRAME	80 NO	300. ⁰⁰	24000 -	
ULTRA SONIC BUGULAR ALARM	80 NO	300. ⁰⁰	24000 -	
VENTILATION HATCH WITH OPERATOR	80 NO	300. ⁰⁰	24000 -	
175 X 175 X 12 MMS LEGISOL ANGLE.	80 NO	120. ⁰⁰	9600	
TOTAL SAVINGS			(128,000)	

VAP A7

175x175x6MM ANGLE AT LINTEL SUPPORT

CONCRETE FILLED 16 GAUGE PRESSED METAL FRAME

65x65MM HOLLOW ROLLED SECTIONS FRAMED HORIZONTAL AT 125MM ON CENTRE

6MM TEMPERED GLASS

SOLID STEEL GLAZING STOP BOLTED INTO STEEL BACKING IN PRESSED STEEL FRAME

PRE FINISHED ALUMINIUM COVER WITH MEGAFIX THERMABREAK.

FRESH AIR DOOR.

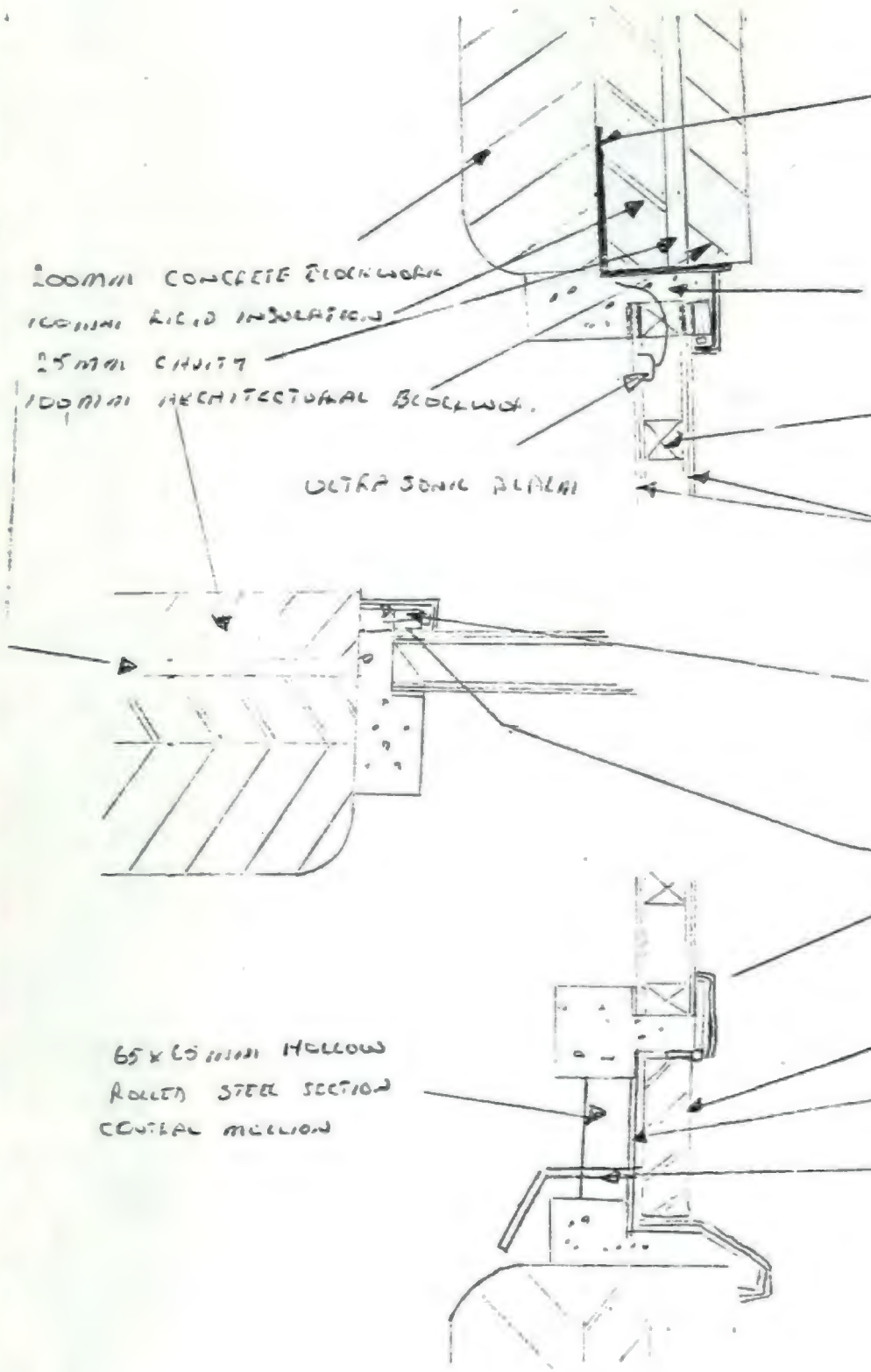
SECURITY GRILL & FLY SCREEN

OPERATING DEVICE

200MM CONCRETE BLOCKWORK
100MM RIGID INSULATION
25MM CAVITY
100MM ARCHITECTURAL BLOCKWORK

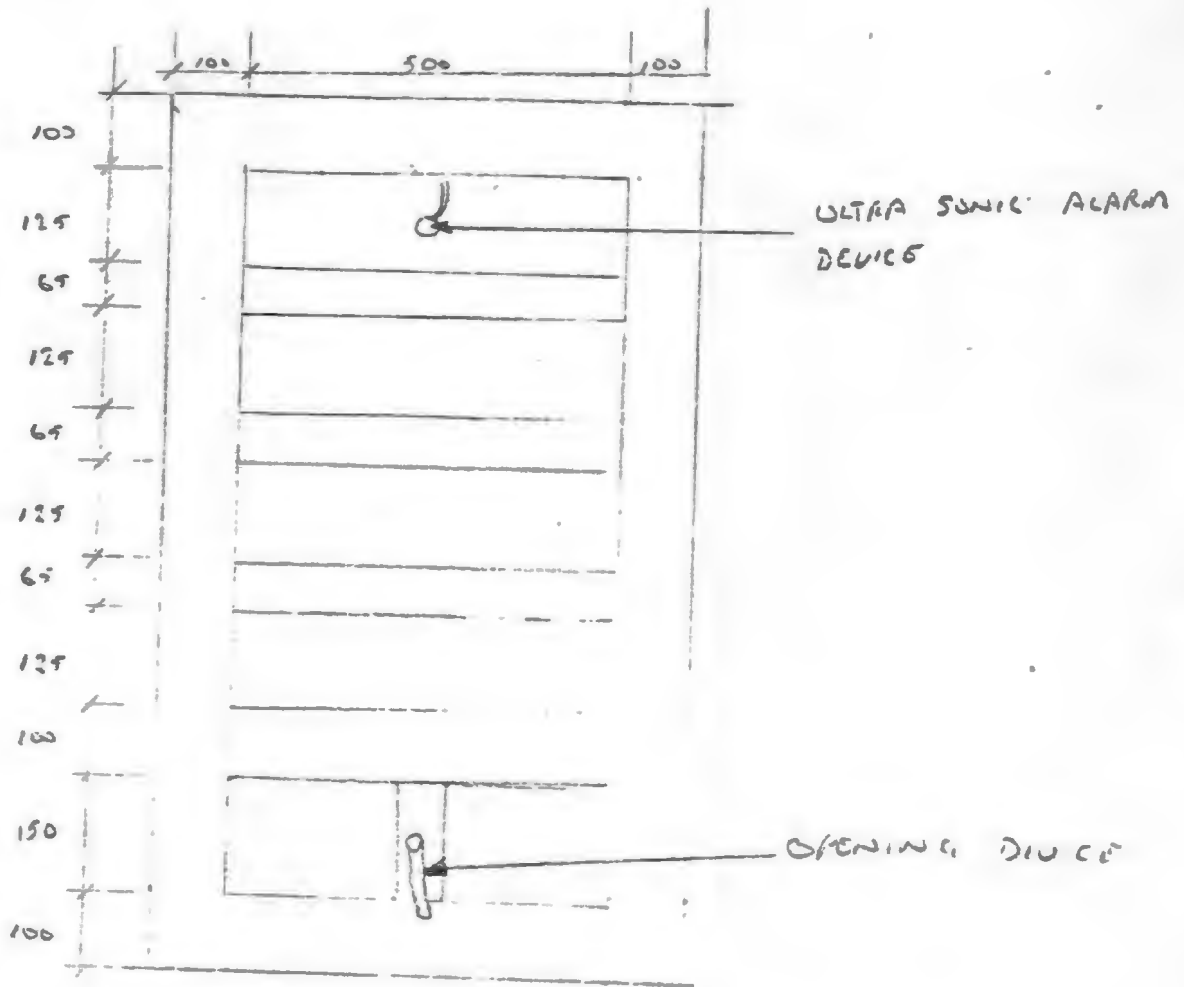
ULTRASONIC PLATE

65x65MM HOLLOW ROLLED STEEL SECTION CENTRAL MULLION



INTERNAL ELEVATION OF CELL WINDOW

VAP 7





WEARING WILLIAMS LIMITED
MANUFACTURERS' REPRESENTATIVES AND DISTRIBUTORS
1140 ST. JAMES STREET, WINNIPEG, MANITOBA R3H 0K7
TELEPHONE (204) 786-8881

September 19, 1985

Mr. Allan Brennan
Hanscomb and Associates
Ste. 205 - One Thornton Court
Edmonton, Alberta
T5J 2E7

Dear Mr. Brennan,

In response to your request I am enclosing sundry literature, plus excerpts from several recent tests performed on "Omnilite" Security Glazing and "Omniarmor" Bullet Resistant Glazing. These were mostly performed to the Walker - McGough specification at the Wyle Laboratories. I will elaborate on these briefly.

Item 1) Omnilite #410000

This was originally developed for the U.S. State Department to resist small arms fire and physical attack. In their tests it stopped three shots from a 9mm SMG in an 8" circle plus severe physical assault. In the Wyle lab test it withstood the specified thirty minute attack. The unit consists of three layers of 1/8" polycarbonate with 1/8" semi tempered glass either side. The cost is approximately \$95.00 per square foot.

Item 2) Omniarmor #412120

This was developed for the U.S. State Department to meet a rigid specification developed after the takeover of the Tehran Embassy. It was required to stop 2 - 7.62mm rounds, plus 1 - 5.56mm all in an 8" circle (see item 2A). It was then subjected to a severe physical attack (see item 2B). It has more recently been tested by the Wyle lab. to withstand 25 rounds from a .44 Magnum plus a 60 minute physical assault (see item 2C). The cost is approximately \$142.00 per square foot.

Item 3) Omnilite #413800

This product has a 1/2" thick multiply polycarbonate core with semi - tempered glass each side. It successfully passed the 60 minute attack test. The cost is approximately \$102.00 per square foot.



WEARING WILLIAMS LIMITED

MANUFACTURERS' REPRESENTATIVES AND DISTRIBUTORS

1140 ST. JAMES STREET, WINNIPEG, MANITOBA R3H 0K7

TELEPHONE (204) 786-8881

-2-

Item 4) Omnilite #413600-09

Similar to the #413600 shown in the catalogue except that the suffix 09 indicates 1/4" tempered glass both sides so the thickness is increased to 1 1/4". This unit has a 5/8" thick multiply polycarbonate core. It is becoming popular for control booths in Correctional Institutions since in the test it successfully stopped 25 shots from a .44 Magnum plus a 60 minute assault. The cost is approximately \$112.00 per square foot.

The greatest demand is for the 7/16", 9/16" and the 11/16" Omnilites at approximately \$55.00, \$62.00 and \$70.00 per square foot. The prices I have mentioned are based on fair quantity and include exchange, duty, brokerage and freight to Winnipeg.

I hope this will be of assistance to you, but should you require further information please do not hesitate to contact me.

Yours very truly,

J.P. Thomas - President

JPT/nmcd
encl.



Subject: ARCHITECTURAL

VAP No.: A8

Item: CELL WINDOWS - CHANGE SHAPE

Date:

Revision:

Related Proposals	Baseline Value \$ 269,000	Savings	
		Capital LCC	Energy O & M

Baseline:

The window used for cells at Warkworth is shown at attached sketch #1.

Proposed:

Change shape and size of window to framed slot window using steel or reinforced concrete framing meeting the slot opening criteria of 115 mm (see attached sketch #2).

Advantages

Disadvantages

More economical.

Nil

More readily supplied.

Easier to install.

Accepted by CSC technical

criteria.

Easier to maintain.

Savings

Capital Cost: \$164,300

Life Cycle Cost: --

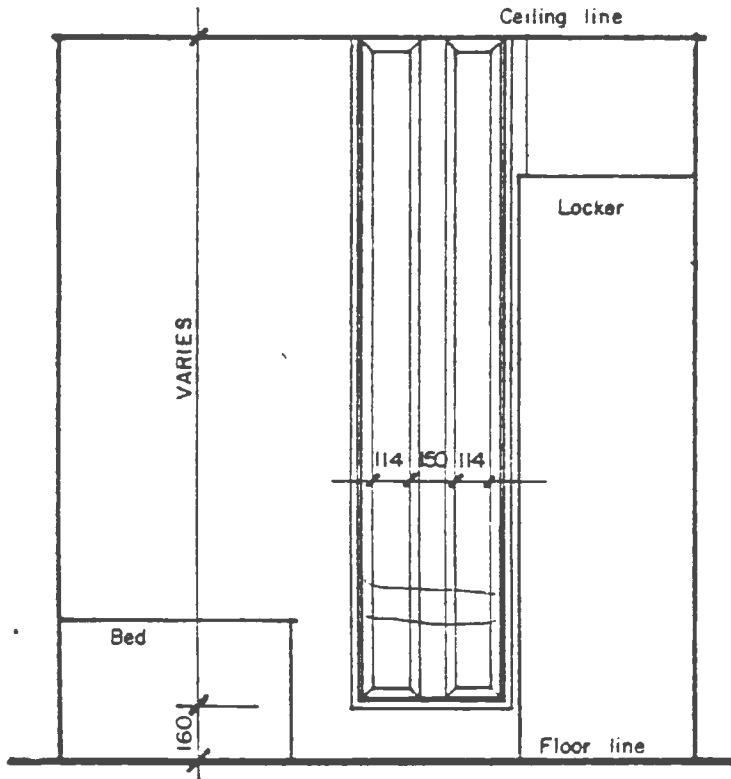
Classification: B1

CORRECTIONAL SERVICE CANADA Building Sub - System
 Architecture SECURITY WINDOWS - SWA

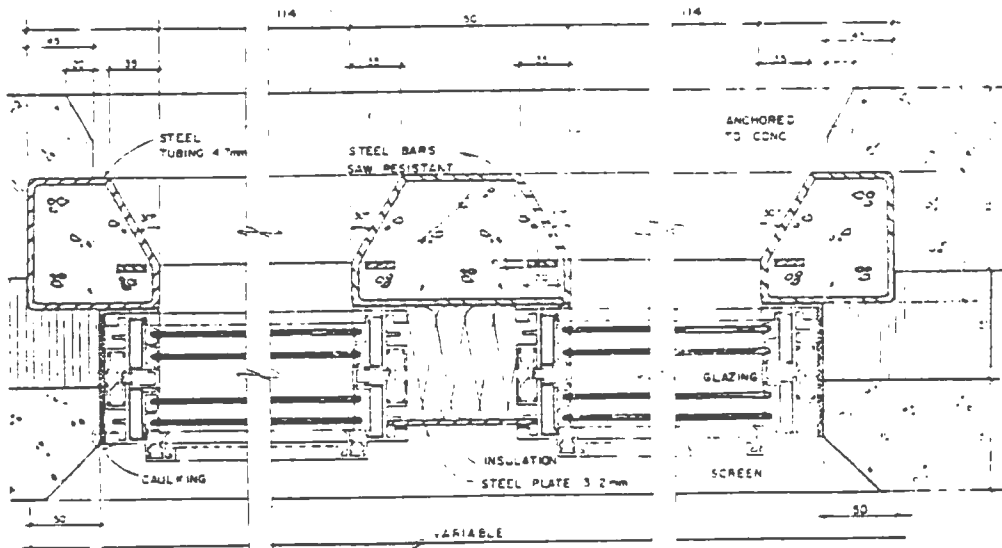
status: FINAL PLATE: 1
 issue: 85 - 02 - 22 rev:

SK # 2

TYPICAL SLOT WINDOW



SWA Slot Window Interior Elevation
 FOR S5, S6 & S7 FULL WALL HEIGHT OPENING.



PLAN VIEW



Subject: ARCHITECTURAL

VAP No.: A9

Item: CELL WINDOWS - ARCHITECTURAL SURROUND

Date: _____

Revision: _____

Related Proposals	Baseline Value \$ 74,000	Savings	
		Capital LCC	Energy O & M

Baseline:

Architectural surround separate component from wall.

Proposed:

Eliminate architectural surround build in direct to masonry wall.

Advantages

Disadvantages

Reduce cost.

Very little.

Simpler installation.

Possibly less aesthetic.

Savings

Capital Cost: \$64,000

Life Cycle Cost: —

Classification: B2



Subject: ARCHITECTURAL

VAP No.: A10

Item: NON CELL WINDOWS - INTERGLAZE BARS WITH ALARM

Date: _____

Revision: _____

Related Proposals	Baseline Value \$ 75,396	Savings	
		Capital LCC	Energy O & M

Baseline:

Steel frame and security glazing.

Proposed:

Steel framed, interglazed steel bars 6 mm tempered glass - ultrasonic alarm -
- placed only at high levels.

Advantages

Cost savings.

Disadvantages

Relies on guard response time to provide security.

Savings

Capital Cost: \$14,000

Life Cycle Cost: --

Classification: C1

	QUANTITY	RATE	\$
<u>OMISSIONS</u>			
FRAMES.	84m ²	224. ⁰⁰	18816
GLAZING			
TYPE 3	53m ²	600. ⁰⁰	31800
WIRED	1.35m ²	650. ⁰⁰	878
TYPE 5.	53m ²	300. ⁰⁰	15900
			(\$ 67 394)
<u>ADDITIONS</u>			
FRAMES	50m ²	224. ⁰⁰	11200
EXTERNAL WALL	34m ²	175. ⁰⁰	5950
6mm TEMPERED	100 ⁵⁵ m ²	60. ⁰⁰	3300
BAR.	100m ²	250. ⁰⁰	25000
ALUMS.	100		5000
OMISSIONS	67 394		\$ 53 150
ADDITIONS	53 150		
	(\$ 14 244)		



Subject: ARCHITECTURAL

VAP No.: All

Item: NON CELL WINDOWS - GLAZING AREA

Date: _____

Revision: _____

Related Proposals	Baseline Value \$ 38,000	Savings	
		Capital	Energy
		LCC	O & M

Baseline:

Steel frame and security glazing.

Proposed:

Reshape and reduce glazing area by 50% slot window and use tempered glass, etc.

Advantages

Disadvantages

Reduced cost.

Reduced natural light.

Extent depends on treatment.

Reduced view to outside.

Savings

Capital Cost: \$19,000

Life Cycle Cost: —

Classification: B1

	QUANTITY	RATE	S
VAP. A 3(a) - 6		B/F	
<u>OMMISSIONS</u>			
Window frames.	84 m ²	224.00	(18816
Glazing type 3	53 m ²	600.00	(31800
Units with second glass inner pane	1.35 m ²	650.00	(878
Precast concrete window surrounds	263 m	155.00	(40765 23935
			92250
<u>ADDITIONS - ASSUME 50% REDUCTION IN GLAZED AREA</u>			
Steel frames 1,300 x 114.5 mm	180 No	200	36000
Glazing	180 No	50.00	9000
Frame 175 x 175 x 12 mm Angled	180 No	42.00	7560
Reduced Section Sills			2022
TOTAL SAVINGS			8 (72894) 82264
		C/F	1935



Subject: ARCHITECTURAL

VAP No.: A12

Item: NON CELLS WINDOWS - ARCHITECTURAL SURROUND

Date: _____

Revision: _____

Related Proposals	Baseline Value \$ 73,700	Savings	
		Capital LCC	Energy O & M

Baseline:
 Architectural surround separate component from wall.

Proposed:
 Eliminate architectural surround build in direct to masonry wall replace with more wall and tie in.

Advantages	Disadvantages
Reduced cost.	Very little.
	Possibly less aesthetic.

Savings

Capital Cost: \$30,000

Life Cycle Cost: —

Classification: B2



Subject: ARCHITECTURAL

VAP No.: A13

Item: EXTERIOR STAIRCASES

Date:

Revision:

Related Proposals A14	Baseline Value \$ 62,680	Savings	
		Capital LCC	Energy O & M

Baseline:

Roofed steel landing with stairs in two flights.

Proposed:

Berm up against building, uncovered landing, and half flight of stairs. See pictures of Lamacaza. Note however, relocation of internal stairs and relocation of exterior stairs under VAP A14.

Advantages

Cost saving.
Shorter building escape.

Disadvantages

Additional snow clearing.
(marginal as other entrance have to be cleared).

Savings

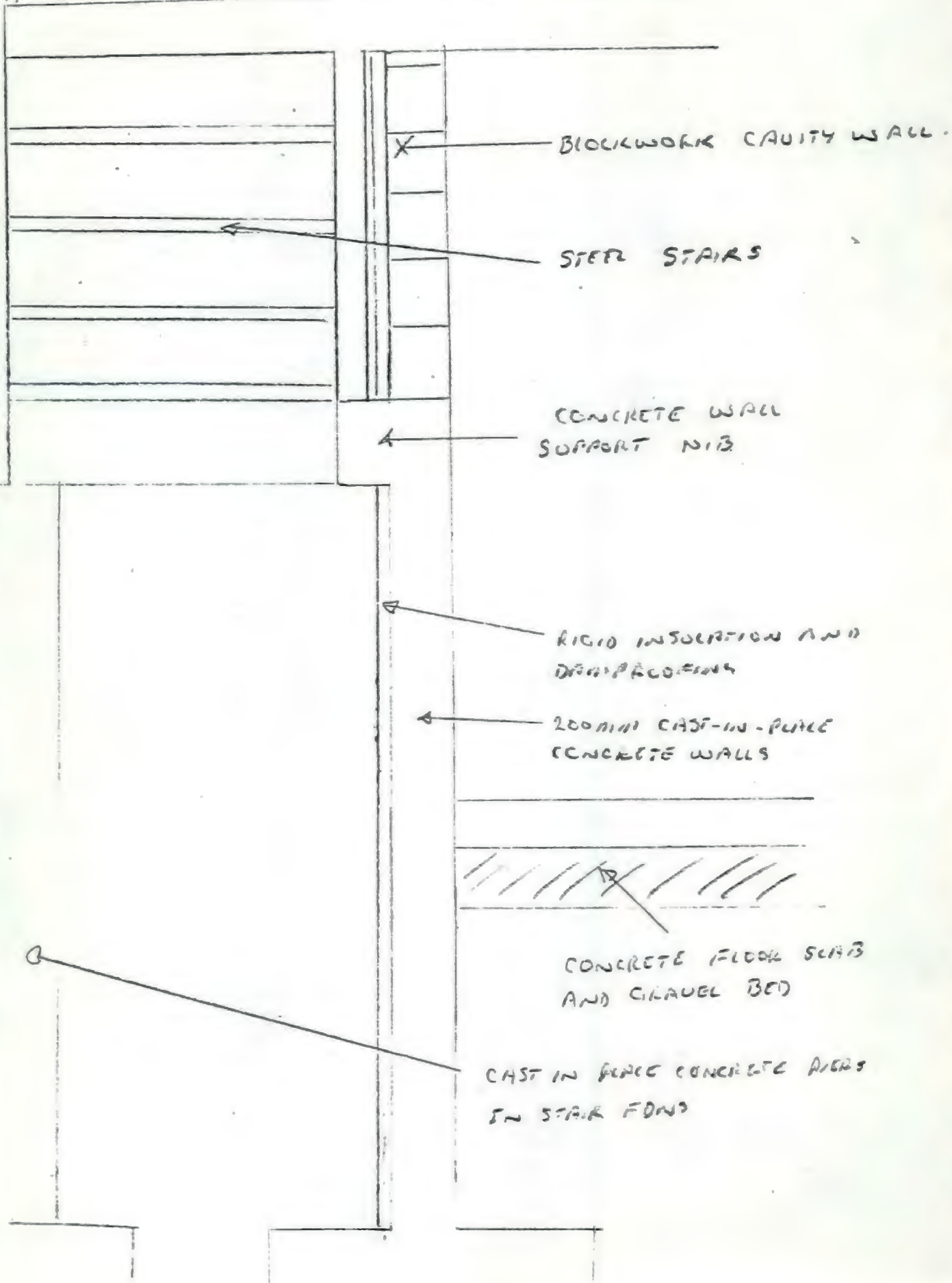
Capital Cost: \$48,460

Life Cycle Cost: --

Classification: A2

	QUANTITY	RATE	\$	
<u>OMMISSIONS</u>				
CONCRETE SLAB-ON-GRADE	13.6 m ²	22.50	306	-
STEEL STAIRCASE AND HANDRAILS	ALLOW	SUM	3000	-
STEEL ROOF CONSTRUCTION	ALLOW	SUM	2826	-
ROOF FINISH	ALLOW	SUM	4019	-
FINISH TO UNDER SIDE	ALLOW	SUM	3768	-
EXTERIOR WALLS	10 m ²	175	1750	
TOTAL OMISSIONS			(\$ 15,670)	
<u>ADDITIONS</u>				
EAST-IN PLACE CONCRETE WALL 200 mm THICK	10 m ²	137 ⁰⁰	1380	
DAMP PROOFING	10 m ²	5 ⁰⁰	50	
50 mm RIGID INSULATION	10 m ²	20 ⁰⁰	200	
300 x 300 mm CONCRET. FDN. PIER	2.5 m	210 ⁰⁰	525	
STEEL STAIR HALF FLIGHT	ALLOW	SUM	1200	
BERM	2 m ³	10 ⁰⁰	200	
TOTAL COST SAVING X 4 NO STAIRCASES			2 (\$ 12,115)	(\$ 48,460)

REVISED EXTERNAL FIRE
STAIRS



X — BLOCKWORK CAVITY WALL.

STEEL STAIRS

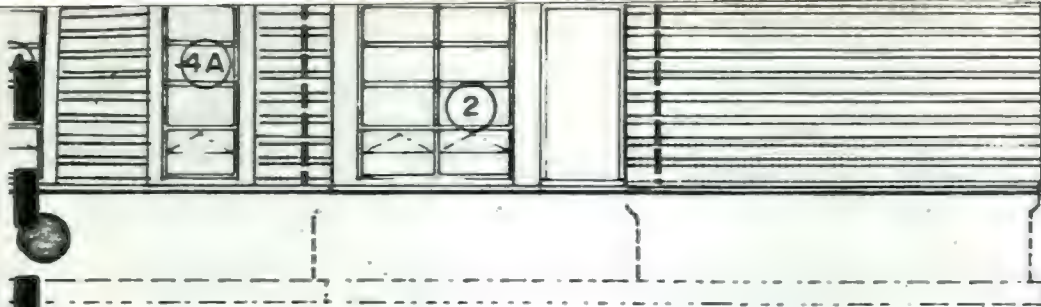
CONCRETE WALL
SUPPORT NIB

RIGID INSULATION AND
DAMP PROOFING

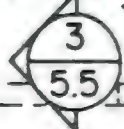
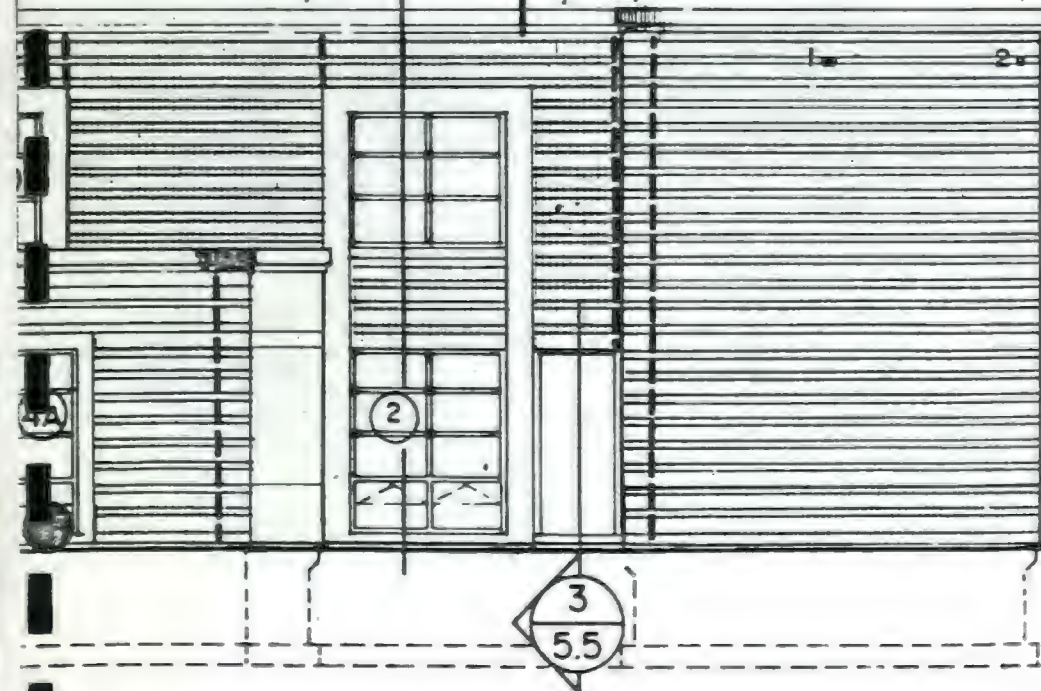
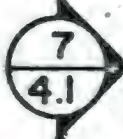
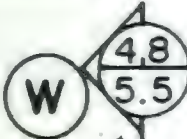
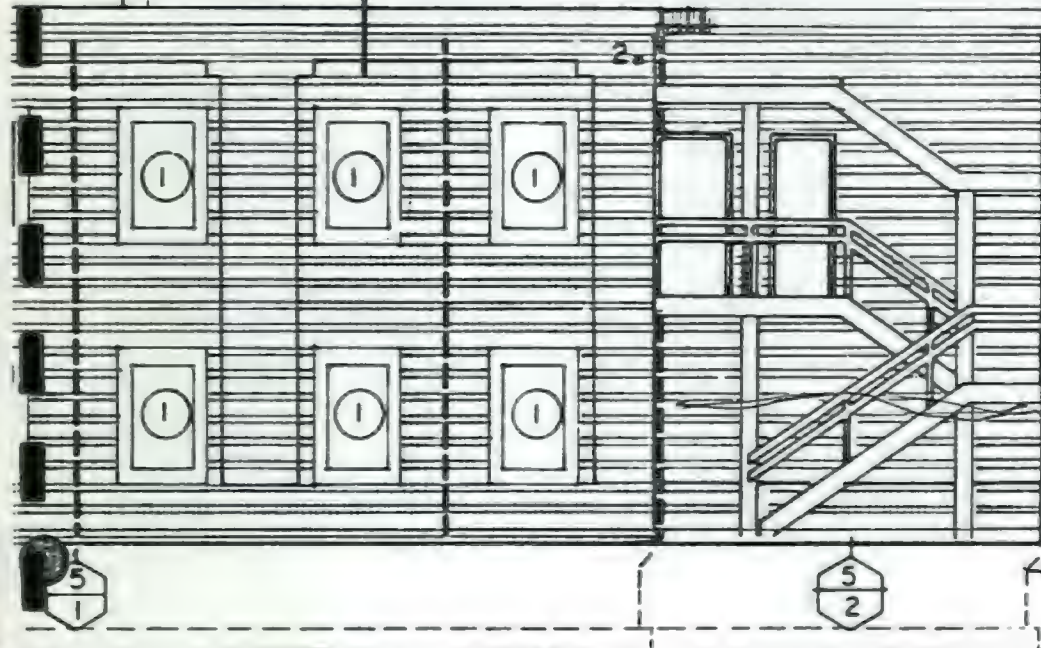
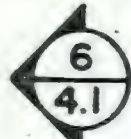
200MM CAST-IN-PLACE
CONCRETE WALLS

CONCRETE FLOOR SLAB
AND GRAVEL BED

CAST IN PLACE CONCRETE AREAS
IN STAIR FORMS



EXISTING FIRE ESCAPE STAIRS



(2-2)



PLATE XIII
CM UNIT EXTERIOR SHOWING
ESCAPE STAIRCASE



PLATE XIV
LA MACAZA CONVENTIONAL UNIT SHOWING
ENTRANCE & ESCAPE STAIRCASE



Subject: ARCHITECTURAL

VAP No.: AI4

Item: INTERNAL STAIRCASES

Date:

Revision:

Related Proposals A13	Baseline Value \$ 23,000	Savings	
		Capital	Energy
		LCC	O & M

Baseline:

Two sets of staircases in each (4) dayroom.

Proposed:

Delete one set of stairs in each dayroom with exterior stairs relocated to ends of upper galleries.

Advantages

Disadvantages

Cost saving.

Longer walking distances to upper floors.

Better views of cells.

Savings

Capital Cost: \$10,700

Life Cycle Cost: --

Classification: B1



Subject: ARCHITECTURAL

VAP No.: A15

Item: MECHANICAL ROOM STAIRS

Date:

Revision:

Related Proposals	Baseline Value \$ 3,350	Savings	
		Capital	Energy
		LCC	O & M

Baseline:

Concrete staircase enclosed at ground level with opening and balustrade at mechanical room.

Proposed:

Move staircase outside building, change to steel construction, and move entry door to upper level; additional interior space available is 13 m² at each level.

Advantages

Disadvantages

Better escape function.
Frees up space ground floor and mechanical floor.
Eliminates opening in floor.

Marginally more maintenance for snow clearing and painting.

Savings

Capital Cost: \$1,300

Life Cycle Cost: --

Classification: B1

RELOCATE STAIRS TO MECHANICAL ROOM TO OUTSIDE	QUANTITY	RATE	\$
Omit stair flight Internal wall 43x32 No	1376.00		1000 1238
Outside steps & handrails			1120.
			<u>\$3358</u>
Omit SOG Roof slab Roof coverings	5m ²	260	
	5m ²	810	
	5m	60	
as Electrical Mech.	5	229	
	6	230	
			1404
			<u>\$4762</u>
Add new exterior staircase			2000
			<u>\$2762</u>



Subject: ARCHITECTURAL

VAP No.: A16

Item: SMOKE BAFFLES

Date: _____

Revision: _____

Related Proposals	Baseline Value \$ 36,000	Savings	
		Capital LCC	Energy O & M

Baseline:

Drywall ceiling bulkhead and metal framed wired glass screen at high level.

Proposed:

Extend drywall and metal studs down at top of roller shutters to provide single hollow section support for shutters.

Advantages

Disadvantages

Lighter weight.

Appearance of openness reduced.

Cost reduction.

Reduces vision from other wings (not from control room).

Faster construction.

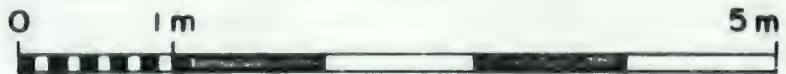
Savings

Capital Cost: Saving \$8,400

Life Cycle Cost: --

Classification: A1

	QUANTITY	RATE	\$
Smoke Baffle ↓			
Onit Baffle below ceiling ↓			10992
Add Dry wall baffle	34 m ²	44 ⁰⁰	(1496)
Paint dills	68 m ²	5 ⁰⁰	(340)
Hollow section beam	7.5 m = 250 kg	3 ⁰⁰	(750)
			(2586)
			8406
			<u> </u>



S TYPE 206 SMOKE BARRIER

1000

← GB ABOVE CEILING TAPED & CAULKED →

GB CEILING

GLAZING

5
7.6

6

6

6

STEEL PANELS

207

120 ACC

1
7.6

1450

STEEL PANELS

200 200

3200

GLAZING

ROLLING SHUTTER

SECURITY GLAZING

6
7.6

2

4
7.7

3200

4

3
7.6

4

3200

STEEL PANELS

1173

S TYPE 103 SPLAYED WALL

S TYPE 105 SPLAYED WALL

S TYPE 106

5

ENTRANCE & CONTROL

10mm STEEL BENT

2-2

5
7.7

5
7.7



Subject: ARCHITECTURAL

VAP No.: A17

Item: NON CELL INTERIOR WALLS

Date: _____

Revision: _____

Related Proposals	Baseline Value 170,000 \$	Savings	
		Capital LCC	Energy O & M

Baseline:

200 mm H block and 200 mm hollow concrete blocks filled and reinforced.

Proposed:

150 mm solid concrete block stack bonded reinforced.

Advantages

Disadvantages

Faster construction.

Lower attack resistance.

Reduced cost.

Improved net/gross floor area
(reduction of 6 m² in GFA).

Savings

Capital Cost: \$18,000

Life Cycle Cost: --

Classification: A2

	QUANTITY	RATE	\$		
Reduce 200mm Non cell Walls.					
Secure 200mm walls	344m ²	90 ⁰⁰	30960.		
Non cell 200mm walls	86m ²	50 ⁰⁰	4300		
Add 150 Solid block new	430m ²	50 ⁰⁰	(21500)		
Reduced Floor area Shell Cost	6m ²	663 ⁰⁰	4000		
		/	<u>17760</u>		



Subject: ARCHITECTURAL

VAP No.: A18

Item: INTERIOR CELL AND SECURITY PARTITIONS

Date: _____

Revision: _____

Related Proposals	Baseline Value \$ 170,000	Savings	
		Capital LCC	Energy O & M

Baseline:

200 mm special H block core filled and reinforced as per attached sketch.

Proposed:

Substitute with 150 mm solid concrete block. Stack bonded reinforced with standard block reinforcing each course vertically and horizontally. Install standard 150 mm concrete block core filled in area of electrical conduits.

Advantages

Disadvantages

Faster to erect.

Lower attack resistance in cells.

Less cost.

Less space (frees up area - reduces building by 32 m²).

Savings

Capital Cost: \$89,000

Life Cycle Cost: —

Classification: B2

SUBSTITUTE 150 SOLID BLOCK
 STACK BOND FOR ALL SECURITY
 PARTITIONS

QUANTITY

RATE

\$

CHIT

SECURITY WALLS PERIS

138240

OTHER SECURITY WALLS

30760

169000

Area Partition

Security

500

90

116

Non Security

350

6464

Shell Cost Estimate $6464 \times 0.050 = 323.2$

665

21216

190416

WSP

6 (150 mm) Solid Block masonry

20.36 SF

\$

101200

11

87216



Subject: ARCHITECTURAL

VAP No.: A19

Item: INTERIOR CELL PARTITIONS

Date: _____

Revision: _____

Related Proposals	Baseline Value \$ 111,000	Savings	
		Capital LCC	Energy O & M

Baseline:

200 mm special H block between cells.

Proposed:

150 mm special H blocks between cells.

Advantages

Reduces cost.
Takes up less space (saves
19 m²).

Disadvantages

Slightly reduced attack resistance.
Difficulties at junction with duct walls.

Savings

Capital Cost: \$24,900

Life Cycle Cost: --

Classification: B2

Reduce Thickness of All Brick Partitions.

QUANTITY RATE \$

omit 200 mm Security wall
 $\frac{2}{4} / \frac{5}{33}$
 $\frac{2}{4} / \frac{4}{23}$
 $205.6 \times 3.0 \times 2$

1233 m² 90⁰⁰ 110,970

add 150 mm Ditto
 $205.6 \times 3.0 \times 2$

1233 m² 80⁰⁰ 98,640

~~\$~~ 12,330

omit small cost of reduced floor

9 m² 300⁰⁰ 12,600

~~\$~~ 24,900

	QUANTITY	RATE	\$	
Rebar - AFA # 6 (150)				
in lines of 8" (200)				
2/20/				
2/16/ 3.4				
2/20/ 2.2				
2/20/ 1.5				
26.8				
$380\text{ m} \times .05 = 19\text{ m}^2$ of steel				



Subject: ARCHITECTURAL

VAP No.: A20

Item: INTERIOR PARTITIONS - GLAZED SCREENS

Date: _____

Revision: _____

Related Proposals	Baseline Value \$ 36,000	Savings	
		Capital LCC	Energy O & M

Baseline:
 6.35 mm steel hollow section frames with 5 mm tempered glass.

- Proposed:**
1. Reduce frames to conventional hollow metal frames and/or reducing gauge.
See notes.
 2. Omit to multi-purpose rooms leaving area as open recess.

Advantages	Disadvantages
Lower costs.	Acoustic problems in multi purpose rooms.
Screen might be constructed off site.	

Savings

Capital Cost: Saving \$20,000

Life Cycle Cost: --

Classification: A2

Reduce Colored Screens.

QUANTITY

RATE

\$

Unit - Colored Screens
including Sally Park.

35862

14921.00
20941.00
35862.00

Add Conventionally framed
Screens

73.5 m² 215 15802

\$ 20,060

Subject: ARCHITECTURALVAP No.: A21Item: PRE-ENGINEERED CELL UTILITY CORE

Date: _____

Revision: _____

Related Proposals	Baseline Value \$ 296,000	Savings	
		Capital LCC	Energy O & M

Baseline:

Present design calls for built-in space masonry utility area cores to house plumbing and ventilation services. Each is provided with a secured access door from the day room (see attached drawing).

Proposed:

Reconfigure design to allow use of pre-engineering service space to reduce construction time, provide improved aesthetics and reduce maintenance (see attached sketch).

Advantages**Disadvantages**

Improved space utilization.

Redesign.

Meets ACA requirements.

Concept acceptance.

Meets program.

Cost.

Improves function.

Single source imported.

Reduces installation time.

Co-ordinates with all trades.

Aesthetically pleasing.

Savings (Increase)

Capital Cost: (\$48,000)

Life Cycle Cost: 71,600

Net PW Savings: \$23,600

Classification: A3



Subject: ARCHITECTURAL

VAP No.: A21

Item: PRE-ENGINEERED CELL UTILITY CORE

Page: _____

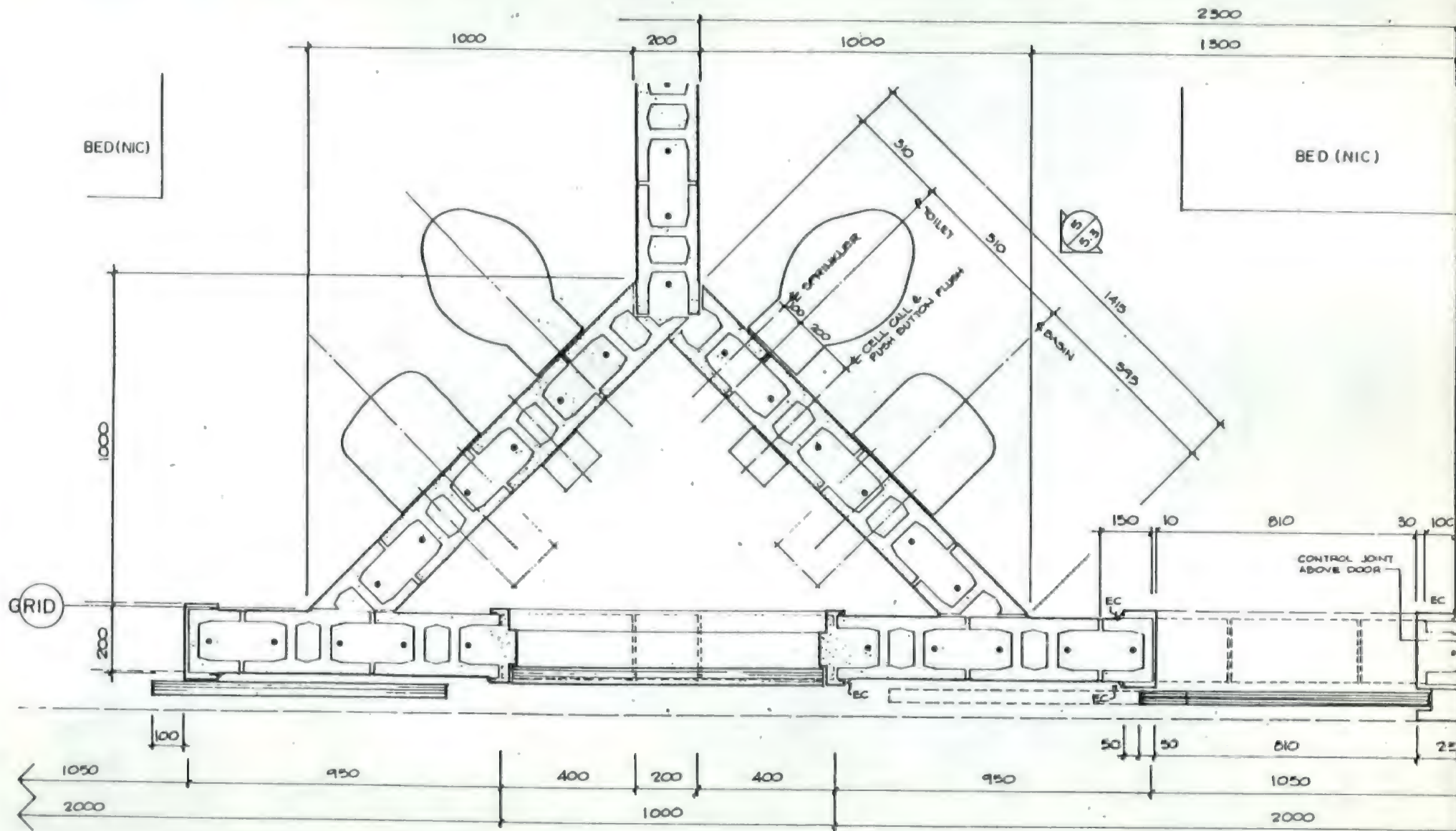
Revision: _____

~~Analysis:~~ _____

~~The stainless steel pre-engineered core is expensive but there is potential for incorporating other pre-engineered systems.~~

- A) heating;
- B) vent ducting;
- C) forming a structural column;
- D) integrating with cell door jamb to eliminate need for wall infill.

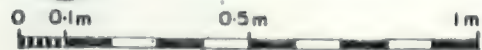
	QUANTITY	RATE	\$	
<u>BASIC DESIGN. (PER 2 CELL UNIT).</u>				
WALL & SECURITY DOOR	40	1600	64,000	
* PLUMBING & PIPE CONNECTIONS	80	250	20,000	
LIGHT, POWER & COMMUNICATIONS	80	650	52,000	
H & V DUCT & WALL REGISTER.	80	200	16,000	
TRIM, MIRROR, ACCESSORIES.	80	500	40,000	
WALL FINISHES	80	100	8,000	
INSTALLATION (LABOR).	80	1200	96,000.	
			<u>\$ 296,000</u>	
<u>PROPOSED CHANGE</u>				
* PRE ENGINEERED UNIT COMPLETE WITH LIKE ITEMS.	40	7900	316,000	
INSTALLATION. (LABOR).	40	360	14,400.	
			<u>\$ 360,400</u>	
			<u>(\$ 64,000)</u>	
CREDIT FOR CSC SUPPLIED LIGHTING FIXTURE	80	\$200	\$ 16,000	
			<u>(48,000)</u>	
* DOES NOT INCLUDE PLUBING FIXTURES WHICH WOULD BE THE SAME FOR EACH OPTION.				
<u>O & M COSTS. (PRESENT WORTH).</u>				
BASIC DESIGN - per cell per year	80	100	8,000 x 17.9 :	143,200
PROPOSED CHANGE	80	50	4,000 x 17.9 :	71,600
BASED ON 12% INTEREST @ 30 YEARS 8% DIFF ESCAL				
		9.19 PW FACTOR		71,600



1 TYPICAL CELL DOOR AND MECHANICAL ACCESS

7.3

BASIC DESIGN



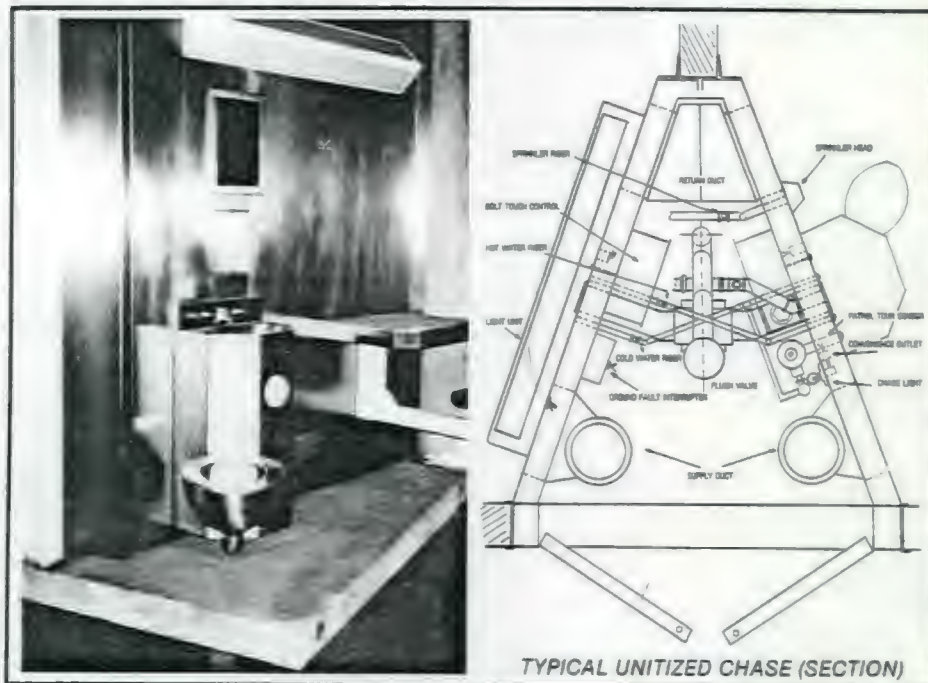
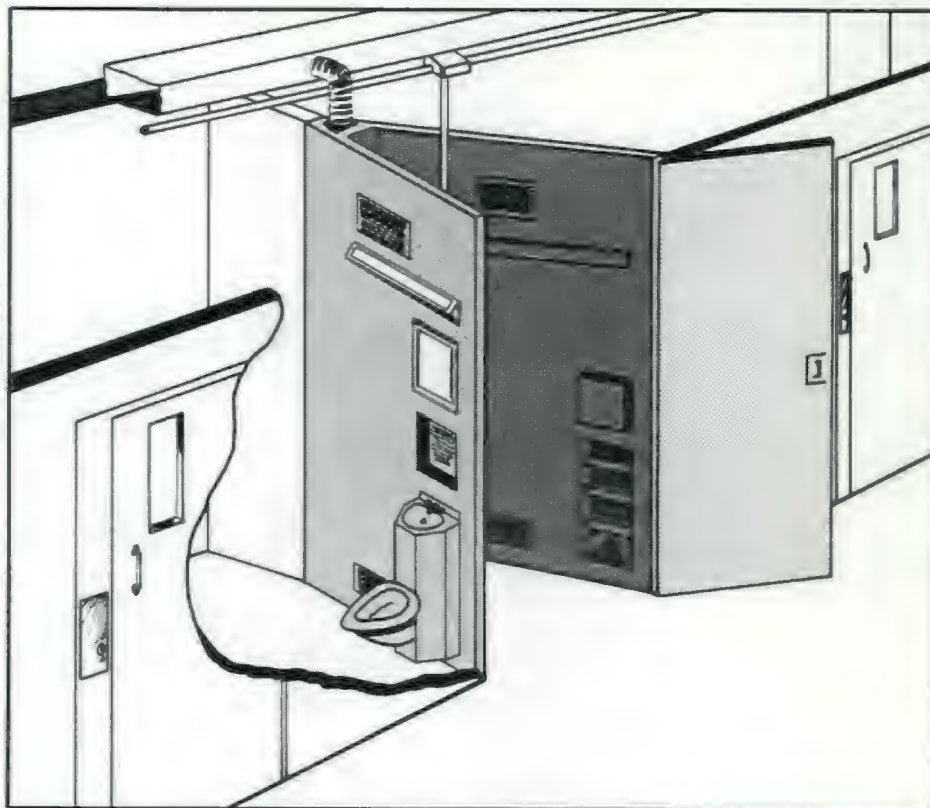
UNITIZED SERVICE CHASE

Provides the Owner/Specifier/ Construction Manager with a single source supplier of the most frequently specified hardware and mechanical items for use in inmate cell construction. An expanded list of standard features and a broad list of available options will meet virtually every design need.

Complete flexibility of unit heights permits installation in a variety of applications ranging from cast-in-place, precast, tilt-up or concrete masonry units or steel wall panels.

Unitized service chase reduces costs, coordination problems and floor space requirements when compared to standard field construction methods.

Please refer to selection chart on back page for standard and optional features.



DETENTION SYSTEMS & SALES INC.

FEATURE SELECTION WORKSHEET

(Check appropriate items)

WALLS:

- Standard* 11 Gauge Stainless Steel
Type 304, # 3 Finish
- 14 Gauge Stainless Steel
Type 304, # 3Finish

ACCESS DOOR(S):

- Standard* Door(s) with Security Lock & Piano Hinge
- Standard* 1/4" Carbon Steel-Prime Painted
- 11 Gauge Stainless Steel
Type 304, # Finish
- Single Door
- Double Door
- Access Panel

ACCESSORIES:

- Standard* Lighting Fixture
- Standard* Mirror 12" x 16"
- Standard* Recessed 8" x 10" Shelf
- Standard* Clothing Hooks (Auto Release)
- Standard* Combi-Mounting Box (Plumbing)
- Standard* Fire and Sound Insulation
- Standard* Supply Air Grille
- Standard* Floor/Ceiling Leveling System
- Wall Hung Desk
- Wall Mounted Stool
- Wall Hung Book Shelf

LIGHTING:

- Standard* 24", 36" or 48" Fluorescent
Pre-wired (Meets ACA Std.)
- Standard* Night Light Pre-wired
- Incandescent
- Light Lens
- Perforated Stainless Steel
- Polycarbonate Safety Glass
- Bullet Proof Glass
- Specify Other: _____
- On/Off Plate Switch
- Bolt Touch Control Dimmer
(Incandescent)
- Bolt Touch Control On/Off
(Fluorescent)

CORRIDOR LIGHT CONTROLS:

- | | |
|--|---|
| <input type="checkbox"/> Mounted Chase Wall Exterior | <i>Pre-Wired</i> <input type="checkbox"/> |
| <input type="checkbox"/> Remote Infrared Control | <input type="checkbox"/> |
| <input type="checkbox"/> Touch Control—On/Off | <input type="checkbox"/> |
| <input type="checkbox"/> Key Switch | <input type="checkbox"/> |

LIFE SAFETY FEATURES:

- Smoke Detector
- Sprinkler Head Pre-piped
- Dry System

PERSONNEL PROTECTION:

- Standard* Patrol Tour Sensor
- Computer Recognition System
and Annunciator Panel
- "Body Alarm"
- "Help"
- "Health"
- "Fire"
- Indication of Time and Cell
Check by Officer—CRT and
Printer Output

ELECTRICAL ACCESSORIES:

- | | |
|---|---|
| <i>Standard</i> <input type="checkbox"/> Ground Fault Interrupter | <i>Pre-Wired</i> <input type="checkbox"/> |
| <input type="checkbox"/> T.V. Outlet | <input type="checkbox"/> |
| <input type="checkbox"/> Cell Convenience Outlet | <input type="checkbox"/> |
| <input type="checkbox"/> Cigarette Lighter | <input type="checkbox"/> |
| <input type="checkbox"/> Intercom/Monitoring Equipment | <input type="checkbox"/> |
| <input type="checkbox"/> Inmate Door Release | <input type="checkbox"/> |
| <input type="checkbox"/> Button | <input type="checkbox"/> |
| <input type="checkbox"/> Bolt Head | <input type="checkbox"/> |
| <input type="checkbox"/> Chase Light | <input type="checkbox"/> |
| <input type="checkbox"/> Chase Convenience Outlet | <input type="checkbox"/> |
| <input type="checkbox"/> Quick Disconnect in Chase | <input type="checkbox"/> |

HVAC:

- Return Air Grille
- Supply Air Duct
- Return Air Duct
- Supply Damper
- Exhaust Air Grille

PLUMBING:

- Combi Toilet/Lav Fixture
- Flush Valve
- Service Supply Pre-piped
- Instantaneous Water Heater
- Liquid Soap Dispenser
- Drain, Waste, Vents Pre-piped
- Solenoid Water Shut-Off Valve
- Toilet Seat
- Towel Hook

As manufactured by:
REC

DEFINITION SYSTEMS & SALES, INC.

P. O. Box 578
BLOOMINGTON, ILLINOIS 61702

(309) 663-8011

LETTER OF TRANSMITTAL

TO HANNSCOMBE CONSULTANTS
209 ST. PAUL - WEST
MONTREAL, QUEBEC H2Y2A1

DATE	28 OCTOBER 85	JOB NO.
ATTENTION	MR. JEFF WARE	
RE		

WE ARE SENDING YOU Attached Under separate cover via _____ the following items:

- Shop drawings Prints Plans Samples Specifications
 Copy of letter Change order _____

COPIES	DATE	NO.	DESCRIPTION
4 sets			UNITIZED SERVICE CHASE 101A, DSS/REC, SPEC 11193
	REC	12428	TYPICAL DRAWING ; SN 107/84 PH-3 SPRAY NOZZLE
			EASTER QUINS ELEC (see TCS-12) & spec section 16212 & 16444
			ECSI mobile command center, ECSI computer-terminal sheet.
6 EXTRA			UNITIZED SERVICE CHASE 101A

THESE ARE TRANSMITTED as checked below:

- For approval Approved as submitted Resubmit _____ copies for approval
 For your use Approved as noted Submit _____ copies for distribution
 As requested Returned for corrections Return _____ corrected prints
 For review and comment _____
 FOR BIDS DUE _____ 19 _____ PRINTS RETURNED AFTER LOAN TO US

REMARKS

FOR BUDGETARY PURPOSES:
EACH CHASE - 2 CELLS (# 6,365⁰⁰ US \$)
PER ATTACHED OPTION (DOES NOT INCLUDE
SELECTION SHEET. (DUTY OR EXPORT TAXES
MATERIAL ONLY = NO INSTALLATION) - INCLUDES 2 HOURS FACTORY
SUPERVISION / CHASE.
NOTE: PRICE DOES NOT INCLUDE COMPUTER SYSTEM
BUT DOES INCLUDE INSTALLATION OF SENSORS

COPY TO _____

SIGNED: Joe Weidemann



FEATURE SELECTION WORKSHEET

(Check appropriate items)

WALLS:

- Standard* 11 Gauge Stainless Steel
Type 304, # 3 Finish
- 14 Gauge Stainless Steel
Type 304, # 3Finish

ACCESS DOOR(S):

- Standard* Door(s) with Security Lock & Piano Hinge
- Standard* 1/4" Carbon Steel-Prime Painted
- 11 Gauge Stainless Steel
Type 304, # Finish
- Single Door
- Double Door
- Access Panel

ACCESSORIES:

- Standard* Lighting Fixture
- Standard* Mirror 12" x 16"
- Standard* Recessed 8" x 10" Shelf
- Standard* Clothing Hooks (Auto Release)
- Standard* Combi-Mounting Box (Plumbing)
- Standard* Fire and Sound Insulation
- Standard* Supply Air Grille
- Standard* Floor/Ceiling Leveling System
- Wall Hung Desk
- Wall Mounted Stool
- Wall Hung Book Shelf

LIGHTING:

- Standard* 24", 36" or 48" Fluorescent
Pre-wired (Meets ACA Std.)
- Standard* Night Light Pre-wired
- Incandescent
- Light Lens
- Perforated Stainless Steel
- Polycarbonate Safety Glass
- Bullet Proof Glass
- Specify Other: _____
- On/Off Plate Switch
- Bolt Touch Control Dimmer
(Incandescent)
- Bolt Touch Control On/Off
(Fluorescent)

CORRIDOR LIGHT CONTROLS:

- | | | |
|--|-----------|--------------------------|
| <input type="checkbox"/> Mounted Chase Wall Exterior | Pre-Wired | <input type="checkbox"/> |
| <input type="checkbox"/> Remote Infrared Control | | <input type="checkbox"/> |
| <input type="checkbox"/> Touch Control—On/Off | | <input type="checkbox"/> |
| <input type="checkbox"/> Key Switch | | <input type="checkbox"/> |

LIFE SAFETY FEATURES:

- Smoke Detector
- Sprinkler Head Pre-piped
- Dry System

PERSONNEL PROTECTION:

- Standard* Patrol Tour Sensor
- Computer Recognition System
and Annunciator Panel
- "Body Alarm"
- "Help"
- "Health"
- "Fire"
- Indication of Time and Cell
Check by Officer—CRT and
Printer Output

ELECTRICAL ACCESSORIES:

- | | | |
|--|-----------|--------------------------|
| <i>Standard</i> <input checked="" type="checkbox"/> Ground Fault Interrupter | Pre-Wired | <input type="checkbox"/> |
| <input type="checkbox"/> T.V. Outlet | | <input type="checkbox"/> |
| <input checked="" type="checkbox"/> Cell Convenience Outlet | | <input type="checkbox"/> |
| <input type="checkbox"/> Cigarette Lighter | | <input type="checkbox"/> |
| <input type="checkbox"/> Intercom/Monitoring Equipment | | <input type="checkbox"/> |
| <input type="checkbox"/> Inmate Door Release | | <input type="checkbox"/> |
| <input type="checkbox"/> Button | | <input type="checkbox"/> |
| <input type="checkbox"/> Bolt Head | | <input type="checkbox"/> |
| <input type="checkbox"/> Chase Light | | <input type="checkbox"/> |
| <input type="checkbox"/> Chase Convenience Outlet | | <input type="checkbox"/> |
| <input type="checkbox"/> Quick Disconnect in Chase | | <input type="checkbox"/> |

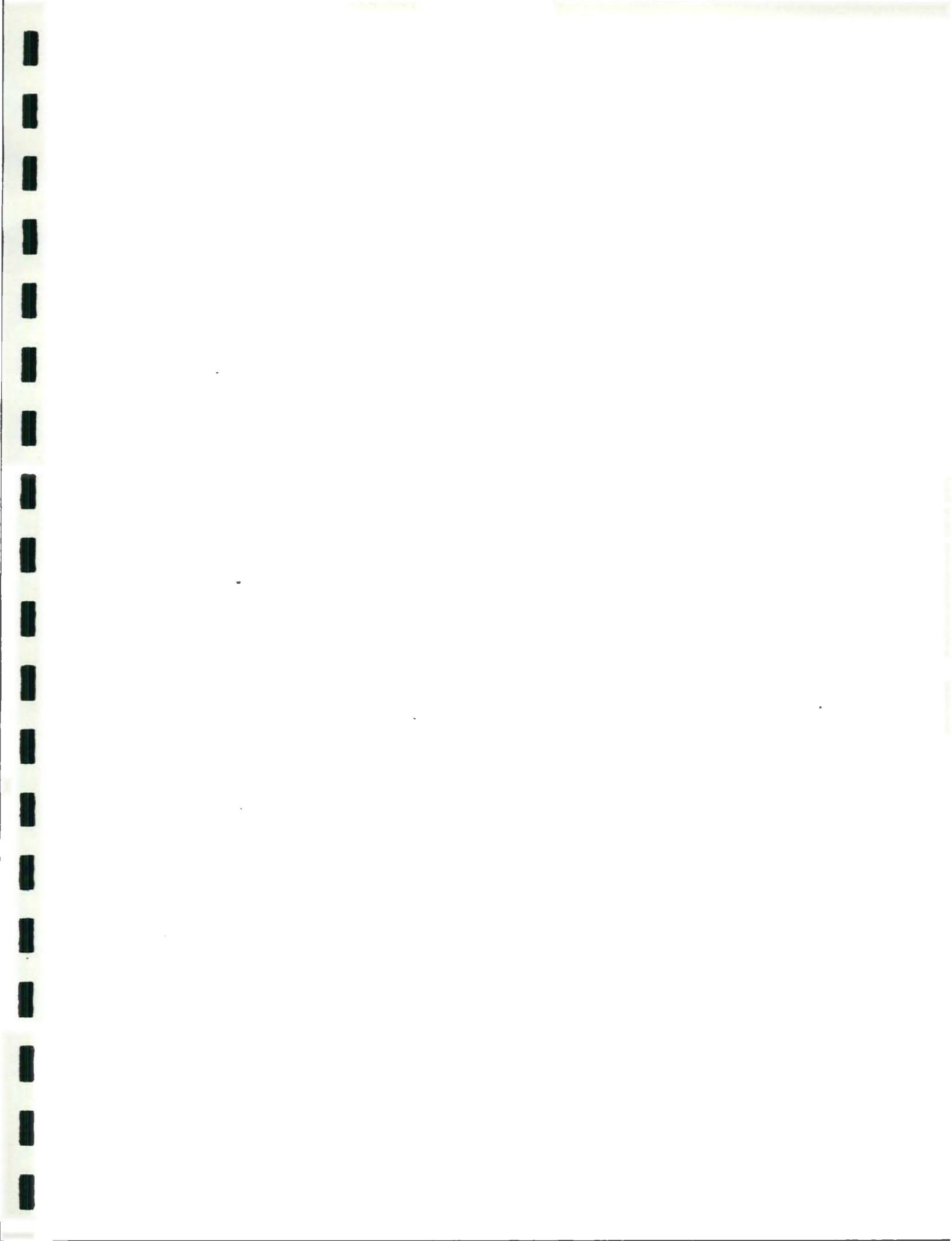
HVAC:

- Return Air Grille
- Supply Air Duct
- Return Air Duct
- Supply Damper
- Exhaust Air Grille

PLUMBING:

- Combi Toilet/Lav Fixture
- Flush Valve
- Service Supply Pre-piped
- Instantaneous Water Heater
- Liquid Soap Dispenser
- Drain, Waste, Vents Pre-piped
- Solenoid Water Shut-Off Valve
- Toilet Seat
- Towel Hook

As manufactured by:
REC



DSS/REC PREFABRICATED SERVICE CHASE

In the past, the service chase usage has been varied due to the creative nature of the designer, engineer and other influences due to the restrictions and recommendations caused by the several associations, institutions, societies and other forces from the local, regional, state and federal levels. The service chase, to date, has been primarily a field fabricated vertical shaft housing plumbing piping, tempered air distribution ductwork, electrical and electronic raceways. Many contrivances have been attached to the inmate "cell" side of this housing, including, but not limited to, combination lavatory-water closet, mirror, shelf, light fixture, intercom, view-port (observation window) air supply and return grilles, and all those other innovative creations architects and engineers have designed through the course of time. With the latest requirements for inmate well-being and the activities of the courts imposing requirements on the various levels of government to comply with the laws implicitly, and due to the potential nature of the inmate to be vandalizing and destructive, the several amenities provided the cell are not the "off-the-shelf" quality of construction. All attached items as well as the wall itself are being fabricated utilizing the most indestructive, vandal-resistant materials available. Assorted manufacturers in the Continental United States produce these fabrications which causes an undisputed coordination dilemma in the contractor's office and most disconcerting, in the field.

Deliveries to the site are not always consistent with the need for installation. Distribution in the field to the proper location for the specific fixture or part is often, likewise, inconsistent with the need for installation. All these inconsistencies are time consuming. Time is money. Ultimately the user (Owner) pays for these inequities. DSS realizing a need for a consolidation of the multitude of assorted mechanical contrivances repeatedly utilized in the construction of the detention cell, has developed a single source, factory fabricated service chase. This prefabricated service chase has two walls arranged to service two adjacent inmate cells affording the most efficient utilization of common utility runs, and the least amount of gross space. The third wall incorporates full size, 180 degree swing doors for open access to the service side of the components incorporated into the cell walls. The prefabricated service chase can be fabricated for interior wall access or exterior wall access.

The prefabricated service chase can be arranged to be installed in cast-in-place concrete, precast concrete, tilt-up concrete, concrete masonry units or steel wall panels. The jambs are arranged for flexibility of wall panel thickness.

9-3-85

SECTION 11193

PREFABRICATED STAINLESS
STEEL SERVICE CHASE

PART 1 - GENERAL:

1.01 WORK INCLUDES:

- A. Prefabricated Stainless Steel Service Chases shown on the drawings and in the schedules.
- B. The (General Contractor) (Security Contractor) shall provide the prefabricated stainless steel service chase.

1.02 RELATED WORK:

A. Specified Elsewhere:

- 1. Division One, Related Sections
- 2. 03300 Concrete
- 3. 03421 Precast Prestressed Hollow Slab Units
- 4. 03423 Precast Prestressed Structural Framing
- 5. 03600 Grout
- 6. 05500 Metal Fabrications
- 7. 07900 Caulking and Sealant
- 8. 08110 Hollow Metal Work
- 9. 08305 Access Panels
- 10. 08700 Finish Hardware/Security Hardware
- 11. 10800 Toilet Accessories
- 12. 11190 Security/Detention Equipment
- 13. 11191 Custom/Security Hollow Metal Work
- 14. 11196 Security Hardware
- 15. 11198 Security Controls Systems
- 16. 15400 Plumbing Systems
- 17. 15800 Ventilation
- 18. 16510 Lighting
- 19. 16721 Fire Alarm and Detection System
- 20. 16762 Intercommunication System
- 21. 16790 Door Monitoring and Control Wiring

B. Related Work by Others:

- 1. Plumbing Contractor shall, under a separate contract, provide plumbing connections, hot and cold water supply, drain waste and vent lines to plumbing equipment.

25 March 85

2. Ventilating Contractor shall, under separate contract, provide supply, return, exhaust ductwork, accessories and connections to ventilating equipment.
3. Electrical Contractor shall, under a separate contract, provide connections for power, lighting, intercommunication, smoke detection, fire alarm, security control cable, final connections and wiring.

1.03 QUALITY ASSURANCE

A. Single Source:

1. Provide Stainless Steel Service Chase manufactured by a single firm specializing in the production of this work.

B. Load Test:

1. Construct combination toilet/lavatory detention unit mounting box within the chase structure to withstand a 5000 pound static load placed on the combination fixture without deformation to the wall panel or movement in the joining systems.
2. Load Carrying Capacity of Wall System: Standard wall construction shall carry 2500 - 4000 pounds per lineal foot vertical load. (Specify load).

C. On-Site Supervision:

1. Provide a manufacturer's authorized representative for onsite observation training and supervision for the installation of the chase unit.
2. Provide a minimum of two (2) hours supervision per chase unit.

D. Fire and Insurance Ratings:

1. Comply with the fire resistance, flammability and insurance ratings indicated, and comply with code interpretations by governing authorities.

25 March 85

E. Manufacturer:

1. Detention Systems & Sales, Inc.
P.O. Box 578
Bloomington, Illinois 61701
(309) 663-8011

F. Shop Assembly:

1. Preassemble items in shop to the greatest extent possible to minimize field assembly.
2. Disassemble unit only as necessary for shipping and handling.
3. Clearly identify units for location, re-assembly and coordinated installation.

G. Inserts and Anchorages:

1. Furnish inserts and anchoring devices which must be set in concrete or built into masonry for the installation of the chase unit.
2. See related sections for installation of inserts and anchorages.

H. Welding:

1. Comply with AWS and ASTM welding standards.

I. Plumbing and Mechanical:

1. Provide domestic water, drainage and vent piping in compliance with applicable Building Code for the type specified herein.
2. Comply with Division 15 related Quality Assurance requirements.

J. Electrical:

1. Comply with NEC/NFPA No. 70 as applicable to construction and installation of electrical conduit.
2. Comply with applicable portions of National Electrical Manufacturers Association, NEMA, standards as related.
3. Provide UL listed materials.

25 March 85

4. Provide fire alarm and detection equipment listed by UL and NFPA.

1.04 SUBMITTALS:

A. Manufacturer's Data:

1. Submit 6 copies of manufacturer's product specifications for chase and accessories.
2. Submit 6 copies of installation instructions.

B. Shop Drawings:

1. Submit 6 copies of shop drawings showing
 - a. Layout
 - b. Fasteners
 - c. Construction
 - d. Anchorage details
 - e. Inserts
 - f. Dimensional construction details
 - g. connection points for plumbing
 - h. Electrical work

C. Certificate of Testing:

1. Submit 6 copies of Independent Testing Laboratory reports indicating compliance with static load testing of combination toilet/lavatory mounting system.

D. Engineer Certification:

1. Submit 6 copies of Registered Professional Engineer's Certification of plumbing and electrical system's conformance with State codes and regulations.

1.05 PRODUCT DELIVERY, STORAGE & HANDLING

- A. Deliver all products and equipment in sufficient quantity and time to maintain approved construction schedule.
- B. Store products off the ground, in dry areas, out of way of construction operations. Provide suitable protection for all products while they are waiting installation.
- C. Handle products in a manner to prevent damage to products and other construction.
- D. Protect units and finishes from damage during shipping, storage and handling.

25 March 85

- 1.06 WARRANTY. Warrant all factory work to be free from defects in materials and workmanship for a period of one year.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS:

- A. Detention Systems & Sales, Inc.

2.02 MATERIALS

- A. Use materials which are smooth and free of surface blemishes including pitting, seam marks, roller marks, rolled trade names and roughness.
- B. Stainless Steel: ASTM 304, No. 3 Finish.
- C. Steel Plates, Shapes and Bars: ASTM A36.
- D. Steel Plates to be Bent or Cold Formed: ASTM A283, Grade C.
- E. Steel Tubing: Cold formed; ASTM A500-74a, Grade B.
- F. Steel Bars and Bar Size Shapes: ASTM A306, Grade 65, or ASTM A36.
- G. Cold Finished Steel Bars: ASTM A108, grade as selected by fabricator.
- H. Cold Rolled Carbon Steel Sheets: ASTM A366.
- I. Fasteners:
1. Fasteners shall be stainless steel.
 2. Bolts and Nuts: Regular hexagon head type, ASTM F593 Class I.
 3. Plain Washers: Stainless steel FF-W-92.
 4. Masonry Anchorage Devices: Expansion shields, FS FF-S-325, Cadmium plated.
 5. Lock Washers: Nylon lock nut.
 6. Fasteners shall be exposed to the inside of the chase unit. No fasteners shall be exposed to the cell side of the chase.
 7. Fasteners within secure chase interior are non-security type.

25 March 85

J. Paint for Exposed Carbon Steel:

1. Metal Primer Paint: Red lead mixed pigment, alkyd varnish, linseed oil point, FS TT-P-86, Type 11; or red lead iron oxide, raw linseed oil, alkyd paint, Steel Structures Painting Council (SSPC) Paint 2-64; or basic lead silico chromate base iron oxide, linseed oil, alkyd paint, FS TT-P-615, Type 11.
2. Metal primer selected must be compatible with finish coats of paint. Coordinate selection of metal primer with finish paint requirements specified in Section 09900.

2.02 FABRICATION:

A. Workmanship:

1. Use materials of size and thickness to produce strength and durability in finished product. Work to dimensions shown or accepted on shop drawings, using proven details of fabrication and support. Use type of materials shown or specified for various components of work.
2. Form exposed work true to line and level with accurate angles and surfaces and straight sharp edges. Ease exposed edges to a radius of approximately 1/32" unless otherwise shown. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
3. Weld corners and seams continuously, complying with AWS recommendations. At exposed connections, grind exposed welds smooth and flush to match and blend with adjoining surfaces.
4. Form exposed connections with hairline joints, flush and smooth.
5. Provide for anchorage of type shown, coordinated with supporting structure. Fabricate and space anchoring devices to provide adequate support.
6. Cut, reinforce, drill and tap miscellaneous metal work as indicated to receive finish hardware and similar items.

25 March 85

B. General:

1. Chase configuration shall be triangular, including two (2) cell interior wall panels and one access wall panel.
2. Provide options specified.
3. Chase shall be prewired when electrical accessories are furnished on chase. Terminate chase prewiring at junction boxes ready for final connections by Electrical Contractor under separate contract. Or -
3. Electrical wiring by others.
4. Chase shall be preplumbed with water supply, drain, and vent as indicated and ready for final connections by plumbing contractor under separate contract. (Optional) Or -
4. Plumbing by others
5. Provide supply, return and exhaust ductwork as indicated ready for final field connections by the Ventilating Contractor, under separate contract. Ducts shall have flexible duct connections in series or to the main trunk lines by the Ventilating Contractor, under separate contract. (Optional)
6. Fabricate chase preassembled. (Optional)
6. Fabricate chase in three (3) pieces for installation either before or after interior dividing cell walls are installed. (Optional)
7. The interior of the service chase shall be configured so that all accessories and components requiring maintenance shall be accessible from the chase side, not the cell side.

C. Construction:

1. Frame System:
 - a. Structural shapes shall be 11 gage wall thickness formed carbon steel tubular, angle or stainless steel bent plate.
 - b. Maximum stud spacing-24" o.c.
 - c. Shapes shall frame all openings.
 - d. Weld all joints.

25 March 85

- e. Design framework to transfer vertical loads to floor. Load capacity 2,500 - 4,000 lb. per linear foot. (Specify)
- f. Vertical members shall have 3/8" steel plate "T" brackets at top and bottom with slotted hole attachment with hex bolt and washer for attachment to floor and ceiling.

2. Cell Face Panel:

- a. Full jointless 11 gage (14 gage optional) stainless steel, Type 304, No. 3 finish.
- b. Corners shall be formed, tight radius.
- c. Ends and cut opening edges shall be eased.
- d. Face panel shall be welded to grid system and ground smooth to match No. 3 finish.

3. Access Face Panel:

- a. 11 gage (14 gage optional) minimum wall thickness formed carbon steel tubular, bent plate or structural angle shapes shall form a welded framework.
- b. Full width 11 gage type 304 stainless steel threshold. Secure to tubular steel door jambs for floor anchorage at door sill.
- c. Header above door(s) shall be carbon steel frame welded framework. Cover with 14 gage type 304 stainless steel sheet. No. 3 finish. Weld to framework.
- d. Access Doors:
 - (1) Access doors shall be 11 gage minimum wall thickness carbon steel tubular and structural angle shapes welded into a braced plane with 14 gage cold rolled stock sheet metal (11 gage stainless steel), attached over outside face by welding. Grind welds smooth prior to priming.
 - (2) Access door leaf shall be 2'-3" wide by 6'-0" high.
 - (3) Access doors for two door units shall have one door leaf secured with head and foot bolts of stainless steel rod, capable of being latched in the up or down position from inside the chase.
Or -
 - (3) Access door shall be 1/4" carbon steel plate (11 gage stainless steel) bolted to chase wall. Size shown on chase drawings. (Optional)

25 March 85

- (4) Door head and threshold shall be bored to receive bolts with no play panel movement when in closed position.
 - (5) Active access door leaf shall have dead bolt maximum security locking device, secured from interior side of chase with only cylinder facing to outside. Provide one (1) key per 10 chase units.
 - (6) Deadbolt shall not be accessible from outside chase.
 - (7) Strike shall be formed into door frame or door stile with no detectable protrusion to outside surface.
 - (8) Each door leaf shall be hinged with full height stainless steel piano hinges.
 - (9) Hinges shall allow the doors to open 180 degrees and close tight to continuous stops at head, threshold and strike jamb.
 - (10) Active door leaf shall be adjustable to provide no play movement when in closed position.
- e. All exposed steel pieces, other than stainless steel, shall be factory prime coated.

4. Wall Attachments:

- a. Intersecting wall attachments shall be formed 11 gage stainless steel, type 304 with No. 3 finish.
- b. Jamb connections shall be adjustable to conform to the standard acceptable tolerances for the material being connected.
- c. Adjustable pivot bolts with keeper nuts shall be spaced to securely clamp the jamb members into place and conform to the general configuration of the adjoining wall, leaving minimal interstices.
- d. Adjustments shall be accomplished from the interior side of the service chase.

5. Ceiling and Floor Flush-Mounting Attachment: (Optional)

- a. An adjustable ceiling and floor flush-mount trim shall be furnished for each cell panel.
- b. A continuous 11 gage cold formed (stainless steel optional) angle shape shall be capable of conforming to the standard acceptable tolerances (1/8") of the floor and ceiling materials leaving minimal interstices at each connection point.

- c. The flush mount trim shall be secured with bolts and keeper nuts every 8" o.c. compressing the trim angle to the floor and ceiling material utilizing the horizontal grid frames at the top and bottom of the cell panels as its brace. The flush mounted trim angle shall slide between the cell wall face sheet and a continuous angle brace welded to the grid frame member.

6. Fire Retardant and Sound Deadening Insulation:

- a. Flat metal surfaces shall be sound-deadened with an insulating material either glued rigid block type or spray applied.
- b. Materials and adhesives used shall meet the fire ratings acceptable by the State Fire Marshall and shall not support combustion nor emit a toxic odor or gas as a product of combustion and caused by direct flame, Class "A", flame spread 0-25, smoke density 0-25, and a fuel contribution 0-25.
- c. The material shall be mildew resistant and shall not emit particles to the exposed side.

2.03 WALL PANEL ACCESSORIES: (OPTIONS)

A. Stainless Steel Mirror:

- 1. Size: 12"W x 16"H
- 2. Chrome plated 20 gage sheet steel mirror face.
- 3. 16 gage stainless steel frame.
- 4. Attach to cell wall panel from inside of chase.
- 5. Provide one (1) per cell.
- 6. Fasteners shall be accessible only from chase interior.

B. Stainless Steel Clothes Hooks:

- 1. Provide auto-release clothes hooks.
- 2. Satin finish type 304 stainless steel.
- 3. Acorn Engineering Company's Model Number 1827.
- 4. Provide number as scheduled on drawings per cell.
- 5. Mount hooks through cell panel face from inside of chase.
- 6. Fasteners shall be accessible only from chase interior.

C. Recessed Shelf:

- 1. Provide one 3"W x 10"H x 4"D 11 gage, type 304 stainless steel recessed shelf per cell.

25 March 85

2. Interior and exterior corners shall be formed with a 1/16" radius.
3. Fully weld to cell wall panel with smooth ground and polished welds.

D. Wall Mounted Table and Seat:

1. Provide one (1) set per cell.
2. Table size: 1'6" x 1'6" x 1'2".
3. Seat size: 1'0" x 1'6" x 1'2".
4. 11 gage stainless steel desktop with 2" flanges on all four sides.
5. Wall bases 2-1/2" x 3/8" steel base.
6. 1/2" stainless steel bolt fastener of wall base to wall assembly shall be concealed within assembly structure.
7. Provide steel reinforcement in chase wall.
8. Fastener shall be accessible only from chase interior.
9. Wall mounting bracket shall be a 3" square X 3/16" steel tube.

E. Wall Mounted Stool:

1. Provide one (1) per cell
2. Size: 1'8 1/2"H x 1'0" Dia. seat
3. 11 gage stainless steel seat.
4. Wall mounting bracket shall be a 3" square X 3/16" steel tube.
5. 1/2" stainless steel bolt fastener of wall base to wall assembly shall be concealed within assembly structure.
6. Provide steel reinforcement in chase wall.
7. Fasteners shall be accessible only from chase interior.

F. Preassembly: (Optional)

1. Preassemble three (3) panels of chase so that chase can be set as unit.
2. Provide reinforced lifting lugs.
3. Provide adequate bracing to prevent unit from racking during lifting.

2.04 PLUMBING ACCESSORIES: (OPTIONS)

A. Combination Toilet/Lavatory Fixture Mounting Box:

1. Connection points and brackets shall be welded into the cell chase wall frame for the attachment of the specified combination toilet/lavatory detention unit.

25 March 85

2. The attachment shall withstand a 5,000 pound static load placed on the toilet of the combination unit without deformation to the wall panel or movement in the joining systems.
3. 11 gage minimum structural bracing members shall be welded in place to restrict passage into the chase interior with the combination fixture removed.
4. Openings shall provide the total servicing and maintenance of the combination unit from the interior side of the chase.
5. Adequate space shall be allowed for the connection, servicing and maintaining valves, temperature controls and piping.
6. Plumbing Contractor shall install combination valves, drains and make all final connections under separate contract.

B. Combination Toilet/Lavatory Unit:

1. Model Manufacturer:
 - a. No. 1530/Acorn (1500,1510,1520,1530,1550,1560,1570) (Specify)
2. Options:
 - a. Penal Trol Valves
 - b. Liquid Soap Systems
 - c. Waste Connections, Wall Sleeves
 - d. Drain, Wastes, Vents, Toilet Seats
 - e. Flush Valves
 - f. Mirrors, Shelves, Tumbler Holders
3. Provide flush fitting for toilet, manufacturer's standard.
4. Provide lavatory supply fixture
5. Provide recessed toilet paper roll holder, manufacturer's standard.
6. Provide return air grille in base of unit 50-120 cfm. (Optional)

C. Preplumb Chase Unit:

1. Comply with materials specified in Division 15.
2. Provide hot and cold water supply, sanitary waste and vent piping in chase unit for final connection by Plumbing Contractor under separate contract.

25 March 85

3. Provide Registered Engineer Certification of system design with State codes and regulations.
4. Provide waste and vent piping in compliance with design requirements indicated on drawings.

D. Instantaneous Electric Water Heater:

1. Provide one pipe system water heater unit.
2. Size: 10" X 7" X 4" approximate.
3. KW AMPERAGE AT FLOW RATE, GPM
 INDICATED VOLTAGE INDICATING RISE
 IN DEGREES F

	208V	240V	277V	0.4	0.8	1.2	1.5
6	29	25	22	100	50	33	26
9	44	38	33	NA	75	50	40
11.5	--	48	42	NA	96	64	51

4. Provide flow restrictor.
5. High limit factory set at 137. F (+ or -) 5.F.
6. 20 psi minimum.
7. Unit tested at 300 psi.
8. Manufacturer:
 - a. PVI Industries, Inc.
9. U.L. Listed.

2.05 SPRINKLER ACCESSORIES: (OPTIONAL)

A. Flush Mounted Sprinkler Head:

1. Mount one (1) flush-mounted sprinkler head in wall panel from the inside of the chase through the cell wall.
2. Sprinkler head shall meet the requirements as specified by the local enforcing authority.
3. Sprinkler Contractor shall provide piping and final connection to sprinkler system under separate contract.

2.06 VENTILATION ACCESSORIES: (OPTIONS)

A. Supply Air Grille:

1. Provide stainless steel integral grille as part of stainless steel wall panel.
2. Certified for 112 cfm with maximum 1/4" W.C. static pressure drop.

25 March 85

3. Punched 1/2" square openings with .023" stainless steel No. 10 mesh screen secured in stainless steel frame from service chase interior side.
4. Provide manual sheet metal damper 10" minimum away from grille face in duct board air boot connectable to main air distribution system.
5. Ventilating Contractor shall make final connection and shall balance air system under separate contract.

B. Return Air Grille:

1. Provide integral stainless steel grille as part of stainless steel wall panel.
2. Punched 1/2" square openings with .023" stainless steel 10 mesh screen secured in stainless steel frame from service chase interior side.
3. Ventilating Contractor shall make final connection and shall balance air system under separate contract.

C. Exhaust Air Grille:

1. Provide stainless steel integral grille as part of stainless steel wall panel.
2. Punched 1/2" square openings with .023" stainless steel 10 mesh screen secured in stainless steel frame from service chase interior side.
3. Ventilating Contractor shall make final connection and shall balance air system under separate contract.

D. Supply and Return Air Duct:

1. Comply with Division 15 requirements.
2. Construct ductwork of 1" ductboard in compliance with SMACNA standard details. (as detailed on approved shop drawings, as shown on drawings)

25 March 85

E. Fabrication:

1. Ductwork within the chase shall be constructed to eliminate line-of-sight contact through the chase unit.
2. Ductwork within the chase shall be constructed to inhibit sound transmission through the chase unit.

2.07 ELECTRICAL ACCESSORIES: (OPTIONS)

A. Electrical Outlet:

1. Single 120 volt amp rated electrical convenience outlet.
2. Mount into wall panel from service chase interior side with no exposed fasteners in cell area.
3. Provide ground fault interuptor protection at a point within chase.
4. Outlet shall be groundable with separate ground wire.
5. Connect to chase rewiring system.

B. Switch:

1. Provide flush security type light switch on chase wall.
1. Provide touch control switch, fluorescent only:
 - a. Manufacturer
 1. Easter-Owens Electrical Company.
 - b. Switch shall provide on-off control by touch.
Or -
 - b. Switch shall provide on, off and dimming control by touch. (incandescent only)

C. Flourescent Light:

1. Construction:
 - a. The housing and backplate shall be 14 gage steel.

25 March 85

- b. Flush, flat spanner head screws shall secure housing to backplate.
 - c. Fixture shall be wall mounted and shall be totally accessible for service and maintenance from the backside.
 - d. Fixture shall be installed and replaced from the chase interior.
 - e. Housing shall contain an illumination section providing upright, downlight or up and down light.
 - f. Housing shall accommodate 1-40 Watt R.S. lamp or 2-30 Watt R.S. lamps.
 - g. Lamps by others.
 - h. Ballast shall be HPF, Class-P. 120V.
 - i. Ballast lead wires shall have quick disconnect terminals to allow for rapid removal and replacement of ballast, wireway and lamp module.
 - j. Diffuser shall be .125" thick, clear polycarbonate and .125 tempered glass gasketted and set into an inner steel frame.
 - k. Units shall be U.L. listed.
 - l. Units shall bear the U.L. label mounted on the fixture's reflector assembly.
2. Each assembly shall include: (Options)
- a. Intercom/monitoring equipment.
 - b. Patrol tour.
 - c. Body alarm receiver.
 - d. Activation circuit for intercom when body alarm is activated.
 - d. Necessary push buttons for intercoms, lighting and door release for inmate release mode.
 - e. Barriers shall separate lighting and communication compartments.

25 March 85

3. Night Light:
 - a. The night light shall be 20W. T.S. Flourescent.
 - b. Lamps by others.

4. Optional Accessories:

- a. Intercom.
- b. Smoke detector.
- c. Intercom switch.
- d. Door release switch.
- e. Cigarette lighter.
- f. Sensor.
- g. Supply air diffuser.
- h. Return air diffuser.
- i. Motion detector only.

(Note) (Sensor option can be used for lighting control, patrol tour and/or body alarm.)

5. Fixture Length: 24", 36", 48". (Specify)

6. Model/ Manufacturer:

- a. Mega 155/ ECS Industries

D. Prewire Electric Fixtures:

1. Prewire 120 volt operating items including the light, switch, convenience outlet, smoke detector, etc. (Note options)
2. Connect with 3/4" EMT raceway to a junction box located within the chase interior.
3. Lead from fixtures and contrivances shall be extended through the raceway to the junction box.
4. Items requiring grounded connections shall be extended to the junction box.

25 March 85

5. Wires shall be clearly marked and ready for final connections by the Electrical Contractor under separate contract.

E. Television Outlet:

1. Provide one (1) closed circuit television outlet per cell.
2. Coordinate receptacle with institution's system.

F. Intercom and Monitoring System:

1. Provide intercom system and/or monitoring system.
2. Provide intercom perforation in stainless steel wall for mounting of intercom within chase space.

G. Body Alarm System:

1. System:

- a. Provide a body alarm system utilizing an infrared beam.
- b. The system shall consist of fixed ceiling or wall mounted receivers, portable battery powered transmitters, and a Graphic Panel with a Data panel capable of 12 zones.
- c. Provide installation diagrams, installation and start-up supervision.

2. Transmitter:

- a. The transmitter shall be housed in a lightweight plastic enclosure and be powered by a standard nine (9) volt battery.
- b. Transmitter case shall be equipped with a clip for mounting on a belt.
- c. Transmitter shall be capable of operating at a distance of not less than 250 feet in complete darkness, 125 feet in an area lit by 46 footcandles, and 60 feet in an area lit by 1850 footcandles.
- d. Transmitter shall emit a signal strong enough to actuate the receiver if the infrared beam is bounced off of a wall, floor, or ceiling.

25 March 85

e. Transmitter shall be push button operated, and be equipped with a L.E.D. indicator which flashes when transmitter is operating.

f. Provide (Specify number) transmitters.

*(NOTE: Width of light/body alarm & accessories may require additional width of chase wall to allow for wall studs.)

3. Receivers:

a. The receivers shall be located as shown, or

a. The receivers shall be located on backside of chase wall.

b. The receiver shall be powered by twelve (12) volt DC, and will provide an alarm contact to the Graphic panel.

c. The receiver shall be capable of, as a minimum, a 60 degree receiving angle from the center line of the receiver, in both the horizontal and vertical planes.

d. The receiver shall be capable of operating from -5 degrees to +110 degrees F.

4. Graphic Panel:

a. The Graphic panel shall be comprised of a graphic representation of the body alarm zones, and be equipped with an indicator for each zone, an audible alarm device, and acknowledge / reset buttons.

b. The panel shall be mounted on top of data panel.

c. Data panel shall contain the termination and annunciation logic for the system.

d. Provide CRT and printer.

5. Manufacturer:

a. ECSI, Belleville, New Jersey.

25 March 85

H. Smoke Detector in Return Air Duct:

1. Provide carbon steel bracket for mounting.
2. Provide a Simplex type 4259-52 duct-type smoke detector in a Simplex type 4259-23 housing.
3. Furnish duct board boot around smoke detector which eliminates visual contact from cell to smoke detector and into chase interior allowing for return air flow into central return air system.
4. Final connection from open end of boot to central return air system by Ventilation Contractor under separate contract.

I. Cigarette Lighter:

J. Inmate Release:

K. Quick Disconnect:

1. Provide quick disconnect within service chase for power termination for each cell.

L. Factory Installation in Chase Unit: (Note options)

1. Factory installation:
 - a. Outlet
 - b. Switch
 - c. Light system
 - d. Television outlet
Intercommunication system
 - e. Body alarm system
Smoke detection

25 March 85

- f. Cigarette lighter
- g. Inmate release
- h. Quick disconnect
- i. Patrol tour system

PART 3 - EXECUTION:

3.01 INSPECTION:

- A. Examine the areas and conditions under which the Prefabricated Stainless Steel Service Chase is to be installed. Notify the Contractor in writing of conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected.

3.02 PREPARATION:

- A. Protect adjacent surfaces while installing products against damage and stains.
- B. Locate and arrange anchorage required to accommodate work.
- C. Coordinate with other trades where necessary to make provisions for installation.
- D. Coordinate and operate with other contractors for proper location of roughing-in services and service connections specified elsewhere.

3.03 INSTALLATION:

- A. Install chase units and accessories in accordance with final shop drawings and manufacturer's data.
- B. Plumbing, Ventilating and Electrical:
 - 1. Final plumbing, ventilating and electrical connections by respective Contractors under separate contract.
 - 2. Comply with related Division 15 and 16 sections.
- C. Coordinate with manufacturer's representative for onsite installation instructions.

25 March 85

- D. Securely anchor products in locations required.
- E. Install in alignment, free from warp, twist or distortion, plumb, level & true.
- F. Cutting, Fitting & Placement:
 - 1. Perform cutting, drilling, and fitting required for installation.
 - 2. Set work accurately in location, alignment and elevation, plumb, level, true and free of rack, measured from established lines and levels with lines visually parallel.
- G. Field Welding for Repair of Damaged Material:
 - 1. Comply with AWS Code for procedures of manual shielded metal-arc welding, appearance and quality of welds made, and methods used in correcting welding work.
 - 2. Where surfaces are to be exposed to view, grind welds smooth; finish holes, defects, other imperfections so surfaces will be smooth if painted finish.
 - 3. Damage to stainless steel shall be restored to a No. 3 finish by mechanical means approved by supplier.

3.04 ADJUSTMENT, REPAIRING AND CLEANING:

- A. After connections to electrical power are made, test products to verify operational characteristics.
- B. Adjust and lubricate moving parts to operate smoothly, quietly, without binding.
- C. Remove from product surfaces the manufacturer's temporary labels, protective coatings, marks of identification if provided; wash soiled surfaces, remove foreign material.
- D. Prime Coat Touchup: Immediately after erection, sand smooth any rusted or damaged areas of prime coat and apply touchup of compatible air drying primer.

25 March 85

- E. Work shall be free from scratches, dents, permanent discolorations and other defects; remove and replace damaged parts, surfaces with imperfections, or damaged during installation or thereafter before time of final project acceptance.
- F. Leave work in neat, orderly, clean condition.

3.05 INSTRUCTION AND TRAINING PERIOD:

- A. Provide operating/maintenance manuals and instructions for all detention equipment products provided.
- B. The manufacturer shall provide onsite training of user staff of electronics system.
- C. Provide two (2) - 8 hour days of instruction.

Prefabricated Chase

BENEFITS LIST

- A. 11 Gauge Stainless Steel 304 Finished Face Panel Containing:
1. Combination detention comby fixture (Stainless Steel or Vitreous China).
 2. Stainless Steel or One Way Mirror.
 3. Flourescent Lighting Fixture (4' yields 20 foot candles average light points in typical cell with 30 foot candles at desk level immediately below) with night light.
 4. Supply grilles (and return/exhaust) may accomodate up to 100 CFM at each cell by balancing behind grilles (Contraband).
 5. Tempered air supply with detention grille and adjustable volume control.
 6. Air return with adjustable volume control.
 7. Recessed shelf.
 8. Cigarette lighter (optional).
 9. Infrared Body Patrol.
 10. Intercom and Call Button (optional).
 11. Break-a-way Coathooks.
 12. Smoke Detector (located within return/exhaust ductwork).
 13. Cable Television receptacle (optional).
 14. Rigid reinforcement behind panel with black iron tubing and adjustable head and foot angles for attachment to existing building materials.
 15. Convenience outlet(s) (can be GFI circuit within remote load panel).
 16. Can set up for NC of 30
Ductwork may be offset (eliminating direct transfer cell to cell) and accoustically treated for noise transfer and insulated.

17. Exterior wall installation (with small grille off ductwork for maintaining minimal heat for freezing protection) for minimal guard attendance with maintenance personnel.

18. Sound deadening (optional).

B. Panel and All amenities Conform to State of the Art Corrections Standards.

1. All above at designer's option-total flexibility and choice.
2. None of above amenities are revolutionary, only concept of providing an arrangement for prefabrication.
3. Prefabricated chase offers a multitude of advantages. Off-Site factory fabrication allowing for ultimate consistency of standardization.
4. Speed of delivery of completed mechanical, plumbing, electrical security amenity installation for inmate cells.
5. Standardization for all field connections.

Greenfield flexible connection between home run electrical junction boxes and fixtures.

Flexible ductwork connection between home run HVAC and Exhaust ductwork.

Standardized plumbing fittings for domestic water and sanitary sewer connections (may be adaptable to solvent).

6. Coordination of all trades.

Wall thickness affords more working space over conventional construction materials (concrete or concrete block).

7. Excellent accessibility for maintenance of valves, light fixtures, speakers, HVAC dampers, etc. all from non-inmate areas.
8. Excellent for maximum security or all levels of security applications.
9. Interior wall installation readily for standard chase installation secure 180' swing door access to chase interior provides for ease of maintenance and installation.

10. Chase may be installed prior to or after adjacent wall installation or mechanical/plumbing and/or electrical home run installation(s).
11. Adaptable for installation with any cell wall material.
12. Maintenance virtually void.
13. State of the art unit with definite cost economics since only final connections are made.
14. Unit shipped in two pieces - wall panel with everything but comby fixture attached.

RESEARCH EQUIPMENT COMPANY

Service Chase

Savings in time over conventional chase (below considers coordination, handling, and labor).

<u>Standard Chase</u>	<u>Hours</u>
Light	4
Grilles	6
Comby Fixture	8
Speaker	4
Ductwork	16
Receptacle	2
Switch Outside Door	3
TV Receptacle	3
Mirror	2
Coat Hook	2
	<hr/>
TOTAL	50 Hours

Research Equipment Company Chase

All Above 12 Hours



Subject: ARCHITECTURAL

VAP No.: A22

Item: CELL DOORS

Date:

Revision:

Related Proposals	Baseline Value \$ 403,000	Savings	
		Capital LCC	Energy O & M

Baseline:

14 gauge sliding doors generally in pairs, with part OPI locking system and part OP4 (KR).

Proposed:

14 gauge sliding doors with the following alternatives:

1. Electric beak locking system.
2. Omit requirement for model.
3. Omit requirement for spares.
4. See VAP SP7 - standardized doors to one type only.
5. Reduce door height 100 mm which with VAP S5 reduces floor to floor height by 200 mm.
6. Omit gang release override mechanism.

Advantages

- Reduced costs.
- Reduced building volume (5).

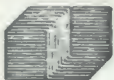
Disadvantages

- Less central control (1).

Savings

Alternatives

	1	2	3	4	5	6
Capital Cost:	\$76,000	8,000	12,000	3,000	30,000	24,000
Life Cycle Cost:	--	--	--	--	--	--
Classification:	A1	A1	A1	C1	B1	A1



Subject: ARCHITECTURAL

VAP No.: A22

Item: CELL DOORS

Page: _____

Revision: _____

Analysis:

Discussions were held with both Foulger Adams and Chubb with some conflicting information. Summarized briefly the following factors emerged:

- A) Heavy gauge steel is essential if replacement costs are to be kept down.
- B) Reductions in steel thicknesses give marginal cost savings.
- C) Similarly reductions in extent of framing give marginal savings and increase damage potential.
- D) Set up costs are a major factor, one single type = minimum set up cost.
- E) Bottom hung units too vulnerable to interference.
- F) Security control requirements considerably increase cost with some duplication to cover remote risk i.e. electric gang release with circuits on standby generator plus mechanical gang release.

The strength of doors is greatly in excess of adjacent walls, which are also fragmented by openings. Consideration might be given to combining a structural pre-engineered duct and centre door mullion to form a continuous cell wall.

	QUANTITY	RATE	\$
1 - concrete base height			
see 8 th			
Exter wall with block masonry	92m	175 ⁰⁰	16100
GF 237 x .204			
20 -			
270 (28)			
+ 60			
FF 242 x .204			
451 .204			
Exter wall with 500mm concrete masonry wall	4.5m ²	200 ⁰⁰	900
Exter wall with 500mm concrete masonry wall	1.2m ²	270 ⁰⁰	324
Internal Security walls			
Perimeter	111m ²	90 ⁰⁰	9990
2.4	66.8 x .204		
5			
1.1	3.2 x 4 x 4 x 2		
	3.3 x 5 x 4 x 2		
	15.2 x 4 x 2		
	9.0 x 4 x 2		
	3.0 x 2 x 4 x 2		
Other concrete walls	20m ²	50 ⁰⁰	1000
90.8			
2/58			
102.6 x 2			
			28373

Reduce Floor to Roes height by
8

New security 200 m

100 m

Concrete internal walls

Paint finish on walls

Ext. 7

97 m²

Inter. 137 = 2

264 m²

50%

361 m²

180 m²

990

1782

30,155

=====



Subject: ARCHITECTURAL

VAP No.: A23

Item: FINISHES - FIBREGLASS BULKHEADS

Date: _____

Revision: _____

Related Proposals	Baseline Value \$ 130,000	Savings	
		Capital LCC	Energy O & M

Baseline:

Preformed fibreglass bulkhead approximately 2 m girth rivetted and caulked to steel fixings. Outside all cells as continuous drop ceiling. Removable for access to services and with rounded edge.

Proposed:

1. Fix bulkhead to door track for better access and reduce fibreglass area.
2. Substitute 15 mm drywall on light gauge metal framing and splayed edge.
3. substitute 15 mm drywall with 12.5 mm plywood.
4. Substitute 16 gauge steel with splayed edge on metal framing.
5. Omit bulkhead paint all exposed work and mount lights on duct shaft wall.
6. Substitute Granex fiberglass board.

Advantages

Disadvantages

Reduced costs (1 & 5).

Easily damaged (2 & 3).

Better access to services (1 & 5).

Higher maintenance cost (2,3,4 & 5).

Simpler construction (1, 2 & 3).

Bad appearance (5).

Lights in inferior location (5).

Savings

Alternatives

	1	2	3	4	5	6
Capital Cost:	\$8,000	116,000	112,500	85,500	120,000	86,980
Life Cycle Cost:	--	(16,500)	(21,200)	(4,500)	(19,800)	(17,590)
Classification:	A1	B2	B2	B1	B3	B1



Subject: ARCHITECTURAL

VAP No.: A23

Date: _____

Item: FINISHES FIBREGLASS BULKHEADS

Revision: _____

Related Proposals	Baseline Value	Savings	
		Capital	Energy
		LCC	O & M
	\$ 130,000		

Baseline:

~~Preformed fibreglass bulkhead approximately 2 m girth rivetted and caulked to steel fixings. Outside all cells as continuous drop ceiling. Removable for access to services and with rounded edge.~~

Proposed:

- ~~1. Fix bulkhead to door track for better access and reduce fibreglass area.~~
- ~~2. Substitute 15 mm drywall on light gauge metal framing and splayed edge.~~
- ~~3. substitute 15 mm drywall with 12.5 mm plywood.~~
- ~~4. Substitute 16 gauge steel with splayed edge on metal framing.~~
- ~~5. Omit bulkhead paint all exposed work and mount lights on duct shaft wall.~~

Advantages

Disadvantages

Reduced costs (1 & 5).	Easily damaged (2 & 3).
Better access to services (1 & 5).	Higher maintenance cost (2,3,4 & 5).
Simpler construction (1, 2 & 3).	Bad appearance (5).
	Lights in inferior location (5).

Savings

Alternatives

	1	2	3	4	5
Capital Cost:	\$8,000	116,600	112,500	85,500	120,000
Life Cycle Cost:	--	(16,500)	(21,200)	(4,500)	(19,800)
Classification:	A1	B2	B2	B1	B3

SECURITY RIVETS AND CAULKING AT
EDGE OF BULKHEAD (TYPICAL)

L 55X55 X4 CONT. C/W 10 ϕ
75 LONG SLEEVE ANCHOR
DRILLED INSERTS @ 600%.

ELEV. 103.200
SECOND FLR.

200

500

EC

delete

250
RADIUS

750

1500

100

EC

delete

Relocate to wall
face between cell doors
PREFORMED FIBREGLASS BULKHEAD

TYPICAL CELL

Bulkhead

SECTION

CAULKING AT TOP OF FRAME (TYPICAL)

plate attached
to door track

SECURITY RIVET (TYPICAL)

159

	QUANTITY	RATE	\$	
Unit				
Suspended timber roof 1 1/2" sub roof	450 m ²	290	129750	
Option 1 For sub roof & insulation Ribbed area	30 m ²	200	6000	
Option 2 Dry wall on insulation & ceiling No ceiling at angle.	450 m ²	26	11700	
	240 m	6	1440	
			15750 = 116607	
Option 3 Dry wall & plywood on light gauge framing	450 m ²	35	15750	
	240 m	6	1440	= 112557
Option 4 16 gauge steel panels	450 m ²	95	42750	
	240 m	6	1440	= 65557
Option 5 Panel concrete Panel studs Panel pipes	450 m ²	9	4050	
	156 m ²	10	1560	
	7 m	5	35	119,335
OPTION 6 - CRANEY FRAMING	450 m ²	86	38700	
	240 m	17	4080	
	TOTAL		43,020	86,980

Life Cycle Costing Estimate
General Purpose Work Sheet

		Original Describe:	Alternative 1 Describe:	Alternative 2 Describe:	Alternative 3 Describe:
Study Title: _____					
Discount Rate: _____ Economic Life: _____					
		Estimated Costs	Present Worth	Estimated Costs	Present Worth
		Estimated Costs	Present Worth	Estimated Costs	Present Worth
		Estimated Costs	Present Worth	Estimated Costs	Present Worth
		Estimated Costs	Present Worth	Estimated Costs	Present Worth
Initial Costs	Initial Costs				
	A. _____				
	B. _____				
	C. _____				
	D. _____				
	E. _____				
	F. _____				
	G. _____				
	H. _____				
	I. _____				
	J. Contingencies _____ %				
	K. Escalation _____ %				
	Total Initial Cost				
Owning Costs	Operations (Annual)				
	A. _____				
	B. _____				
	C. _____				
	D. _____				
	E. _____				
	F. _____				
	Total Annual Operations Costs				
	Maintenance (Annual)				
	A. _____				
	B. _____				
	C. _____				
	D. _____				
E. _____					
F. _____					
G. _____					
Total Annual Maintenance Costs					
Replacement/Alterations (Single Expenditure)					
A. _____					
B. _____					
C. _____					
D. _____					
E. _____					
F. _____					
G. _____					
H. _____					
I. _____					
J. _____					
Total Replacement/Alteration Costs					
Tax Elements					
A. _____					
B. _____					
C. _____					
D. _____					
E. _____					
F. _____					
G. _____					
Total Tax Elements					
Associated (Annual)					
A. _____					
B. _____					
C. _____					
Total Annual Associated Costs					
Total Owning Present Worth Costs					
Salvage	Salvage At End Of Economic Life				
	Building (Struc., Arch., Mech., Elec., Equip.)				
	Other				
	Sitework				
Total Salvage					
LCC	Total Present Worth Life Cycle Costs				
	Life Cycle Present Worth Dollar Savings				

PW - Present Worth PWA - Present Worth Of Annuity

FIGURE F-10 Life cycle costing estimate—general purpose.

Handwritten:
 35,700 x 0.5
 = 17,850

Life Cycle Costing Estimate
General Purpose Work Sheet

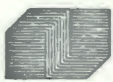
Original Describe: Alternative 1 Describe: **A23.6** Alternative 2 Describe: Alternative 3 Describe:

Study Title: WARRWORTH S4 UNIT

Discount Rate: 12% Economic Life: 30 YEARS

	Estimated Costs	Present Worth	Estimated Costs	Present Worth	Estimated Costs	Present Worth	Estimated Costs	Present Worth	
Initial Costs	Initial Costs								
	A.	<u>CRANE FIBERGLASS</u>		<u>43020</u>		<u>43020</u>			
	B.	<u>BOARDS</u>							
	C.								
	D.								
	E.								
	F.								
	G.								
	H.								
	I.								
	J.	Contingencies %							
	K.	Escalation %							
	Total Initial Cost								
	Owning Costs	Operations (Annual) Escal Rate PWA W/Escal							
		A.							
B.									
C.									
D.									
E.									
F.									
Total Annual Operations Costs									
Maintenance (Annual) Escal Rate PWA W/Escal									
A.									
B.									
C.									
D.									
E.									
F.									
G.									
Total Annual Maintenance Costs									
Replacement/Alterations (Single Expenditure) Year PW Factor									
A.									
B.									
C.	<u>50% YEAR 15</u>	<u>15</u>	<u>0.916</u>	<u>19350</u>	<u>17290</u>				
D.									
E.									
F.									
G.									
H.									
I.									
J.									
Total Replacement/Alteration Costs									
Tax Elements Escal Rate PWA W/Escal									
A.									
B.									
C.									
D.									
E.									
F.									
G.									
Total Tax Elements									
Associated (Annual) Escal Rate PWA W/Escal									
A.									
B.									
C.									
Total Annual Associated Costs									
Total Owning Present Worth Costs									
Salvage	Salvage At End Of Economic Life Year PW Factor								
	Building (Struc., Arch., Mech., Elec., Equip.)								
	Other								
	Sitework								
Total Salvage									
LCC	Total Present Worth Life Cycle Costs								
	Life-Cycle Present Worth Dollar Savings								

PW - Present Worth PWA - Present Worth Of Annuity



Subject: ARCHITECTURAL

VAP No.: A.24

Item: WALL TILING

Date: _____

Revision: _____

Related Proposals	Baseline Value	Savings	
		Capital LCC	Energy O & M
	\$ 9,755		

Baseline:

Ceramic mosaic tiling to floors and walls.

Proposed:

1. 100 mm X 100 mm ceramic tiles.
2. High build epoxy paint.

Advantages

- Cost reduction, less joints (1).
- Cost reduction (2).

Disadvantages

- High maintenance (2).
- Slippery (2).

Savings

Alternatives

	1	2
Capital Cost:	\$2,150	6,900
Life Cycle Cost:	—	(10,446)
Classification:	A1	A3



Subject: ARCHITECTURAL

VAP No.: A25

Item: LOBBY FLOOR FINISH

Date: _____

Revision: _____

Related Proposals	Baseline Value \$ 2,250	Savings	
		Capital LCC	Energy O & M

Baseline:
 Quarry tiles in entrance area.

Proposed:
 Sheet vinyl flooring.

Advantages	Disadvantages
Reduced cost.	Loss of aesthetics.
	Less durable.

Savings

Capital Cost: \$1,350

Life Cycle Cost: (824)

Classification: A3



Subject: ARCHITECTURAL

VAP No.: A26

Item: FINISHES - DRYWALL CEILINGS

Date: _____

Revision: _____

Related Proposals	Baseline Value \$ 5,000	Savings	
		Capital LCC	Energy O & M

Baseline:

Suspended drywall ceiling in central dayroom area.

Proposed:

Omit and paint pipework ducts, etc.

Advantages

Cost reduction.

Disadvantages

Poor appearance.

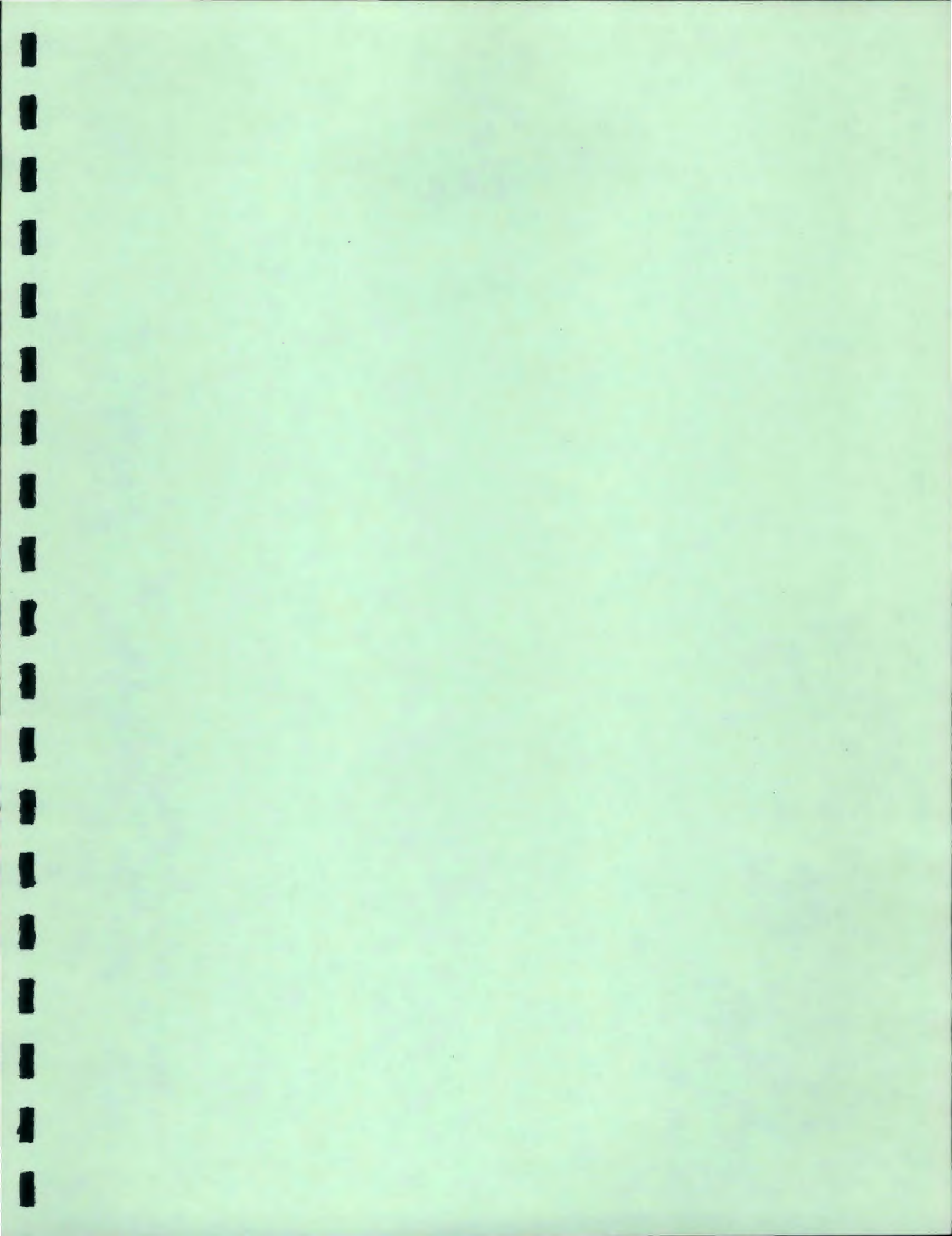
Savings

Capital Cost: \$4,000

Life Cycle Cost: —

Classification: A2

3. STRUCTURAL VAP





SUMMARY OF VALUE ANALYSIS PROPOSALS

Section: SUMMARY OF STRUCTURAL VAP

VAP No.	V A P	Baseline Value	Savings (Increase)		Class.
			Capital	O&M(PV)	
S1	Raise exterior stair footing.	25,000	15,000	--	A1
S2	Substitute blockwork for concrete walls in footings.	78,000	10,000	--	A2
S3	Reduce size of footings.	33,000	17,000	--	B1
S4	Delete 30 mm sand bed under floor slab.	5,000	5,000	--	A1
S5	Reduce drop panel thickness over cells.	11,000	7,800	--	A1
S6	Change concrete specifications for poured slabs.	22,600	1,130	--	A1
S7	Roof structure:	132,000	--	--	--
	1. revise design criteria	--	*3,000	--	B2
	2. redesign slab due to deletion of concrete topping in VAP A1	--	*1,500	--	A1
	3. single level roof & extended use of precast	--	18,000	--	B1
S8	Substitute block interior walls for poured concrete.	50,500	12,000	--	B1
S9	Load bearing exterior block walls in non cell areas.	15,000	2,000	--	B1
S10	Precast building.	*884,000	*97,850	--	C2
	Total (* not included)	\$372,100	\$87,930		

A - Accepted, P - Pending, R - Rejected



Subject: STRUCTURAL

VAP No.: SI

Item: EXTERIOR STAIR FOOTING

Date: _____

Revision: _____

Related Proposals	Baseline Value \$ 25,000	Savings	
		Capital	Energy
		LCC	O & M

Baseline:

Stair footings and adjacent interior footings are founded at 2.65 m below grade to provide cover for frost protection.

Proposed:

Raise the footings to 1.2 m below grade which is adequate to provide for frost protection according to the soils report.

Advantages

Disadvantages

- Shortens piers by 1.35 m.
- Eliminates stepped footings.
- Reduces excavation and granular backfill.
- Reduces 50 mm perimeter insulation area.

Nil

Savings

Capital Cost: \$15,000

Life Cycle Cost: --

Classification: A1

	QUANTITY	RATE	\$
Reduction Depth of Trench 2 m width			
Excavation 4/ 2.5 x 1.300 x 1.30 4/ 4.0 x 600 x 1.30	76 m ³	9 ⁰⁰	684
Remove from site	76 m ³	4 ⁰⁰	304
Backfill	62 m ³	16 ⁰⁰	992
Cured wall 9.5 x 1.3 x 2 = 9.88 4/ 4.0 x 1.3 x 2 = 4.16	14 m ³	100 ⁰⁰	1400
Formwork	140 m ²	45 ⁰⁰	6300
Rebar	1198 kg	.85	1018
50 mm Insulation	70 m ²	12 ⁰⁰	840.00
Gravel	20 m ³	50 ⁰⁰	1000.00
			<u>15,698</u>



Subject: STRUCTURAL

VAP No.: S2

Item: FOOTING WALLS

Date: _____

Revision: _____

Related Proposals	Baseline Value \$ 78,000	Savings	
		Capital LCC	Energy O & M

Baseline:

Concrete internal footing walls.

Proposed:

Type H blockwork.

Advantages

Disadvantages

Reduced cost.

Not good in sulphate soils.

Faster construction.

Careful backfilling required.

Savings

Capital Cost: \$10,000

Life Cycle Cost: --

Classification: A2

	QUANTITY	RATE	\$
Block mass H type in base of concrete walls.			
3			
Omft Concrete 7/42.0 9.0 L 120.0 x 1.5 x .252	45 m ³	110 ⁰⁰	6750
Formwork	360 m ²	45 ⁰⁰	16200
Rebar	6162 kg	.85	5238
			26388.
<u>Add</u> H Block, a reinforcement.	180 m ²	90 ⁰⁰	16200
			10188



Subject: STRUCTURAL

VAP No.: S3

Item: FOOTING

Date: _____

Revision: _____

Related Proposals	Baseline Value	Savings	
		Capital	Energy
	\$ 33,000	LCC	O & M

Baseline:

Footings are 1500 mm wide and on soil a bearing capacity of 100 KPa. Pad footings are 2750 mm square.

Proposed:

Size footings based upon soil test report for Warkworth of 140 KPa (3000 PSF); proposed wall footing 1100mm wide; proposed pad footing 2350 mm square.

Advantages

Disadvantages

Cost reduction.

Nil

Savings

Capital Cost: \$17,000

Life Cycle Cost: --

Classification: B1

	QUANTITY	RATE	\$
Remove North of (crossing)			
Concrete in footing & pads	43m ³	95 ⁰⁰	4085
Formwork	—		
Rebar	2152 kg	.85	1829
Excavation	209m ³	900	1881
Remove from site	20m ³	420	836
Backfill	162m ³	16 ⁰⁰	2592
			<hr/>
			11223
	Add Base		<hr/>
			5900
			<hr/>
			17,123

	QUANTITY	RATE	\$
Remove Rebar - Beam			
Remove Form	107 m ³		981
2/3.05, 3.05 .8 136 = .8			
Remove Form	109 m ³	4.00	436
Brick	1075 m ²	16.00	1712
Concrete columns	1.5 m ³	100.00	150
Form work of columns	12 m ²	45.00	540
Rebar 13.6 m ²	2445 kg	.85	2081

5910-0



Subject: STRUCTURAL

VAP No.: S4

Item: MATERIAL UNDER SLAB ON GRADE

Date: _____

Revision: _____

Related Proposals	Baseline Value \$ 5,000	Savings	
		Capital LCC	Energy O & M

Baseline:

30 mm sand, 275 mm gravel under slab on grade.

Proposed:

To delete the 30 mm sand bed. The slab on grade is structural and reinforced and soil condition at Warkworth are good. It is possible 150 mm gravel may be adequate though this has not been considered in the evaluation.

Advantages

Disadvantages

Reduced cost.

Nil

Reduced construction time.

Reduced excavation.

Savings

Capital Cost: \$5,000

Life Cycle Cost: --

Classification: A1

52

	QUANTITY	RATE	\$	
011 sand in form Only sand bed red	1520 m ²	90 ^c	1368	
Reduce gravel base. from 270 - 150 m	1520 m ²	2.40	3648	
			<hr/> 5016	
Reduce concrete specimen from 30 MPa & 10 MPa	226 m ³	5 ⁰⁰	1130	



Subject: STRUCTURAL

VAP No.: S5

Item: DROP PANELS OVER CELLS

Date: _____

Revision: _____

Related Proposals:	Baseline Value \$ 11,000	Savings	
		Capital LCC	Energy O & M

Baseline:
300 mm drop panels over cells.

Proposed:
Reduce to 200 mm. Slab was dropped to allow radiant heaters to be recessed and provide level, tamper proof ceiling. (Note that this could result in extended use of precast units at roof level - this option has not been considered in this proposal).

Advantages	Disadvantages
Reduced cost.	Ceiling radiant panels may be more vulnerable
Reduced forming requirement.	to tampering.
Provides single level ceiling height for block coursing.	

Savings

Capital Cost: \$7,800

Life Cycle Cost: —

Classification: A1

	QUANTITY	RATE	\$
① omit 30' ... over ebb			
2 nd Floor & Roof Insulin concrete 30' thick	62 m ³	110 ⁰⁰	6820
$\frac{32 \times .2}{.3} = 41 \text{ m}^2$			
... edge	43 ⁰⁰	1200
Fiber 1846 Kg x 2	3692 Kg	.85	3138
		\$	<u>11162</u>
Add Black walls 546 x 100	55 m ²	90 ⁰⁰	6212
			<u>17374</u>
Omit white roof	206 m ²	79 ⁷⁵	16420
Bas precast	206 m ²	65 ⁰⁰	(13500)
		\$	<u>7800</u>



Subject: STRUCTURAL

VAP No.: S6

Item: SPECIFICATIONS FOR SLAB ON GRADE CONCRETE

Date: _____

Revision: _____

Related Proposals	Baseline Value 22,600 \$	Savings	
		Capital LCC	Energy O & M

Baseline:
30 MPA slab.

Proposed:
Change specification to 20 MPA.

Advantages	Disadvantages
<u>Reduced cost.</u>	<u>Nil</u>

Savings

Capital Cost: \$1,130

Life Cycle Cost: --

Classification: A1



Subject: STRUCTURAL

VAP No.: S7

Item: ROOF STRUCTURE

Date: _____

Revision: _____

Related Proposals A1 & M3.1	Baseline Value \$ 132,000	Savings	
		Capital LCC	Energy O & M

Baseline:

Cast in place concrete, 200 mm and 300 mm thick over cells, and 250 mm thick over mechanical space - 200 mm precast hollow planks to remainder - the roof over the mechanical space at the centre is at a higher level.

Proposed:

1. Reduce design criteria to code requirements.
2. Design precast planks to reflect omission of concrete topping proposed in VAP A1.
3. Single level roof and extended use of precast.

Advantages

Disadvantages

Reduced cost (1,2 & 3).

Greater roof deflections.

Reduced time requirements (3).

Equipment.

Simpler construction (3).

Lower floor to ceiling height (3.2 mm) in

Less roof flashings (3).

mechanical room above control room (3).

Savings

Alternatives

	1	2	3
Capital Cost:	\$3,000	1,500	18,000
Life Cycle Cost:	--	--	--
Classification:	B2	A1	B1



Subject: STRUCTURAL

VAP No.: S7

Item: STRUCTURE

Page: _____

Revision: _____

Analysis:

Alternative 1:

The present design is based on a roof load equal to ground snow load and a deflection of 1/360. It is proposed that the criteria be according to code, a roof load at 80% of ground snow load, and deflection of 1/240.

Alternative 2:

If concrete topping is eliminated as proposed in VAP A1, dead loads for hollow core slabs may be reduced by 20%.

Alternative 3:

The cost reduction noted is for a single level roof, design criteria according to code, and 8" precast roof planks in lieu of 10". The resulting floor to ceiling height above the control room is 3.2 m and mechanical equipment in this space must be selected with this limitation.

	QUANTITY	RATE	\$	
REDUCE ROOF HEIGHT, REPLACE EXISTING CAST IN PLACE SLAB WITH HOLLOW CORE PLANKS AND CAST IN PLACE BEAMS				
OMISSIONS :-				
INSITU CONCRETE IN SUSPENDED ROOF SLAB. 250MM THICK	149m ³	110 ⁰⁰	16390.	
FORMWORK TO SUSPENDED ROOF SLAB	950	43 ⁰⁰	40950	
REINFORCEMENT ^{1P} IN SUSPENDED SLABS	14,900kg	.95	14155	
INSITU CONCRETE IN WALLS.	18.9m ³	110 ⁰⁰	2079	x
FORMWORK TO WALLS.	189m ²	43 ⁰⁰	8127	x
REINFORCEMENT IN SUSPENDED SLABS	1890kg	.95	1796	x
200MM BLOCKWORK IN PARAPETS.	36m ²	50 ⁰⁰	1800	x
50MM RIGID INSULATION	103.50m ²	20 ⁰⁰	2070	x
100 MASTIC VAPOUR BARRIER	103.50m ²	5 ⁰⁰	918	x
100MM ARCHITECTURAL BLOCKWORK	103.50m ²	50 ⁰⁰	109	x
PARAPET DETAIL.	70m	18 ⁰⁰	1260	x

TOTAL OMISSIONS (\$ 89550)

SEE NEXT PAGE

	QUANTITY	RATE	\$
<u>ADDITIONS</u>			
			\$
CONCRETE IN BEAMS	14 m ³	110. ⁰⁰	1540.
FORMWORK TO BEAMS	112 m ²	48. ⁰⁰	5376
REINFORCEMENT TO BEAMS	2800 kg	.95	2660
200 MM HOLLOW CORE SLABS	950 m ²	65. ⁰⁰	61750
			\$ 71326
TOTAL OMISSIONS	(89550)		
TOTAL ADDITIONS	71326		
NET OMISSIONS	(18224)		



Subject: STRUCTURAL

VAP No.: S8

Item: INTERIOR CONCRETE WALLS

Date: _____

Revision: _____

Related Proposals	Baseline Value	Savings	
		Capital LCC	Energy O & M
	\$ 50,500		

Baseline:

Poured in place concrete interior walls.

Proposed:

Replace with standard 250 mm or 250 mm core filled and reinforced concrete block.

Note floor plan changes should consider omitting cantilevers.

Advantages

Disadvantages

Faster to build.

Lower attack resistance.

Reduced cost.

Net/gross floor area decreased.

Improved trade sequencing if all interior walls are masonry.

Savings

Capital Cost: \$12,000

Life Cycle Cost: --

Classification: B1



Subject: STRUCTURAL

VAP No.: S9

Item: CONCRETE INNER SKIN IN NON CELL AREAS

Date: _____

Revision: _____

Related Proposals	Baseline Value \$ 15,000	Savings	
		Capital	Energy
		LCC	O & M

Baseline:

200mm poured in place concrete walls as inner skin.

Proposed:

H type block walls with cavities filled and reinforced as load bearing.

Advantages

Disadvantages

Faster construction time.

Nil

Less complex supervision.

Better internal finish.

Cost reduction.

Savings

Capital Cost: \$2,000

Life Cycle Cost: --

Classification: B1

CONCRETE INNER SKIN IN NON CELL AREAS

15,000.

Baseline:

200mm poured in place concrete walls as inner skin.

Proposed:

H type block walls with cavities filled and reinforced as load bearing.

Advantages

Faster construction time.

Less complex supervision.

Better internal finish.

Cost reduction.

Disadvantages

Nil

Savings

Capital Cost: \$2,000.

Life Cycle Cost: —

Classification: B1

INNER SKIN NON CELL BREN.	QUANTITY	RATE	\$
Omit Wall with concrete inner skin 200 mm thick	70 m ²	213 ⁰⁰	14910
Omit 500 mm thick	19 m²	270⁰⁰	5130
		\$	<u>14910</u>
Add Wall with 200 mm Block inner skin with add brick returns	70 m ²	185 ⁰⁰	12950
		\$	<u><u>1960</u></u>

Subject: STRUCTURALVAP No.: S10Item: PRECAST BUILDING

Date: _____

Revision: _____

Related Proposals	Baseline Value \$ 884,000	Savings	
		Capital LCC	Energy O & M

Baseline:

Masonry and void filled and reinforced masonry building, with a mix of cast-in-place concrete and precast horizontal elements.

Proposed:

Precast load bearing and security walls and all precast horizontal elements. This was a non specific system review.

Advantages**Disadvantages**

Speed of construction.

Requires redesign.

Cost.

Limits to fixings.

Potential for bulk order more than one unit.

Restrictions for openings.

Increased movement.

Joint covers required or extensive grouting.

Reduction in potential for site adaptation.

Note: This proposal was developed in consultation with Genstar Industries Ltd., a major supplier of precast.

Savings

Capital Cost: \$10,000

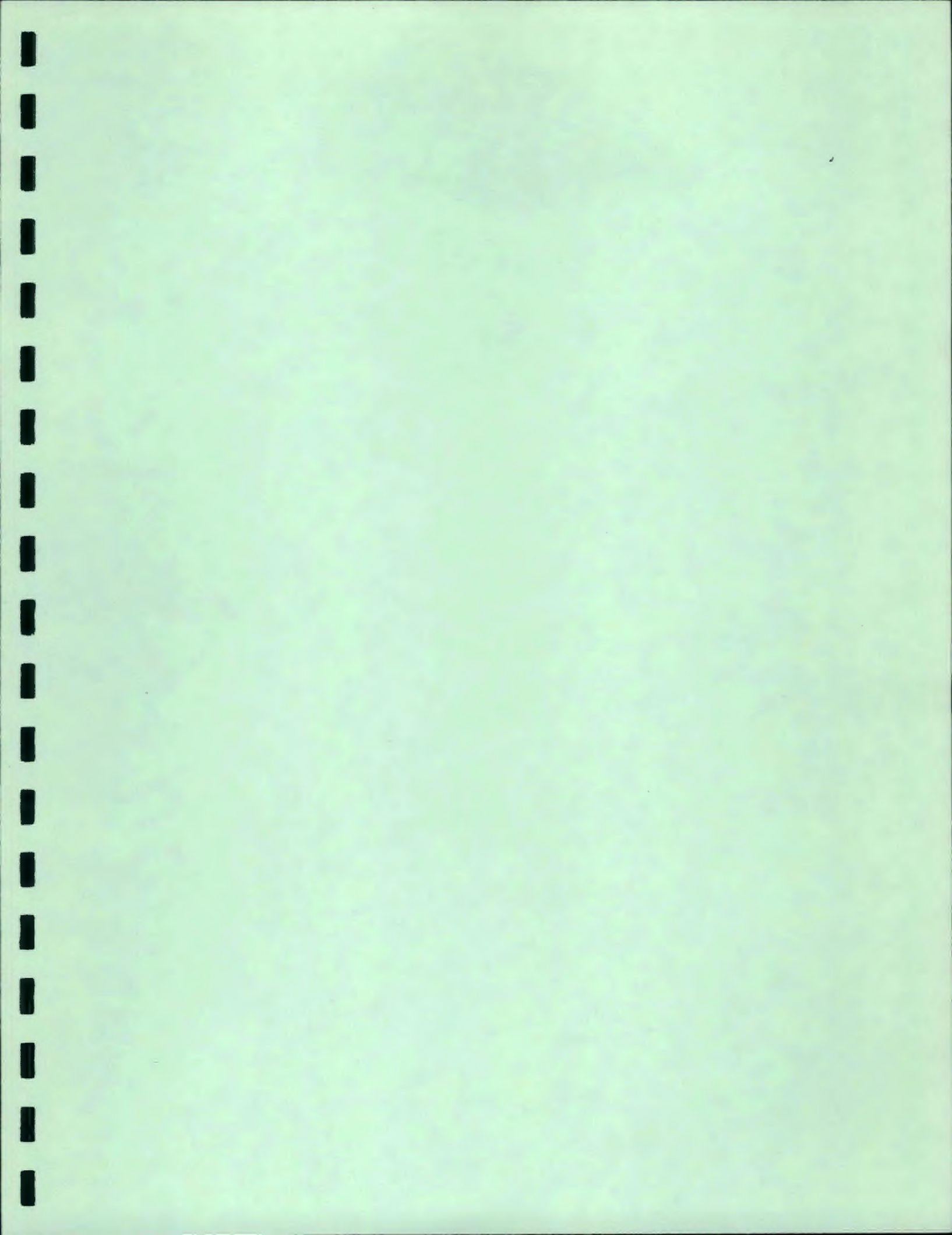
Life Cycle Cost: —

Classification: C2

			QUANTITY	RATE	S
		PRECAST CONCRETE BEARING AND SECURITY ELEMENTS		B/F	
		SUSPENDED OR CANTILEVERED PRECAST WAFFLE SLABS	990.77m ²	110.29	99200
		HOLLOW CORE SLABS	1527m ²	65.00	99300
		INNER SKIN OF EXTERIOR WALL WITH INSULATION, VAPOUR BARRIER, CAVITY AND 150MM SPLIT CONCRETE BLOCK FACE	1431m ²	270.00	386400
		150MM PARTITION WALLS.	2246m ²	130.00	292000
		TOTAL PRECAST COSTS. \$			875900
				C/F	

	QUANTITY	RATE	\$
		B/F	
EXTERIOR WALLS			376 600
BALCONIES AND PROJECTIONS			62 600
INTERIOR PARTITIONS			219 600
SECURITY WALLS	138250		
"	30900		
CSC WALLS	50500		
FLOOR CONSTRUCTION			89200
ROOF CONSTRUCTION			131200
TOTAL DIRECT CONSTRUCTION COMMISSIONS			879200
CONTRACTORS OVERHEAD FOR THREE MONTHS SHORTER CONSTRUCTION TIME			37500
CSC SECURITY ON SITE FOR THREE MONTHS			21000
ELECTRICAL CONDUIT CAST IN			6050
P.W.C PROJECT MANAGER AND SITE INSPECTION FOR THREE MONTHS			30000
TOTAL COMMISSIONS #			973750
TOTAL ADDITIONS (PI)			775906
SAVINGS			197850
		C/F	

4. MECHANICAL VAP





SUMMARY OF VALUE ANALYSIS PROPOSALS

Section: SUMMARY OF MECHANICAL VAP

VAP No.	V A P	Baseline Value	Savings (Increase)		Class
			Capital	O&M(PV)	
M1	Radiant heating panels:	150,000	--	--	--
	1. 14 Ga panels	--	*10,000	--	A2
	2. Field accessories	--	*8,700	--	A1
	3. Increase panel supplied temp 140°C	--	*32,000	--	B2
	4. Panels in cells only	--	*12,000	--	B2
	5. ESWA electric ceiling radiation	--	*60,000	--	C1
	6. Convector	--	85,000	--	B2
	7. Ceiling inverted wall fin	--	*75,000	--	B2
	8. Warm air heating (incl. piping)	--	*110,000	--	B2
	9. Reduce capacity (site adaptation)	--	*5,000	--	B1
M2	Heating piping - 16 zones.	87,000	40,000	--	B2
M3	Decentralize ventilation supply/exhaust and delete humidification.	74,000	32,000	57,000	B1
M4	Heat generation (boiler plant)	27,500	--	--	--
	1. Connect to central plant - side adapt.	--	5,000	--	B1
	2. Electric boilers - side adapt.	--	(6,000)	--	--
	3. Reduce capacity (site adapt.)	--	*3,500	--	B1
	4. Delete boiler breeching	--	*3,000	--	B1
M5	Controls - delete DDC.	62,500	5,000	--	A3
M6	Delete heat recovery exchanger (site adapt.)	5,000	5,000	--	B2
M7	Delete self contained equipment room air conditioning.	7,000	7,000	--	B2
M8	Self contained control room air conditioning.	(3,500)	(1,500)	--	--
M9	WC and basin fixtures - SS.	112,000	(40,000)	--	--
M10	Underfloor sanitary drainage piping.	20,500	5,000	--	A3
M11	Domestic hot water from heating boilers.	4,000	--	--	--
M12	Cold water supply:	37,800	--	--	--
	1. Meter	--	1,250	--	A1
	2. Reduce pipe sizes	--	6,000	--	B1
M13	Storm water:	28,400	--	--	--
	1. Roof drains - reduce no (site adapt.)	--	*7,000	--	B2
	2. Underfloor pipe	--	*3,400	--	A3
	3. Scuppers	--	27,000	--	B2
	4. Relocation of roof drains	--	*1,400	--	B2

A - Accepted, P - Pending, R - Rejected



SUMMARY OF VALUE ANALYSIS PROPOSALS

Section: SUMMARY OF MECHANICAL VAP

VAP No.	V A P	Baseline Value	Savings (Increase)		Class
			Capital	O&M(PV)	
M14	Standpipes hoses and sprinklers:	60,000	--	--	--
	1. Delete sandpipe and hose (site adapt.)	--	20,000	--	A1
	2. Combine stand pipe/sprinklers	--	*8,000	--	B1
	3. Delete hang proof sprinklers	--	5,000	--	A2
	4. Polypropylene sprinklers	--	6,000	--	B3
M15	Site services:	56,000	--	--	--
	1. 6" piping	--	5,000	--	B2
	2. Delete one side of loop	--	*3,000	--	B2
	3. Reroute proposed fire loop - no connection to exterior loop	--	*2,900	--	B2
	Total (*not included)	\$735,200	\$225,450	\$57,000	

A - Accepted, P - Pending, R - Rejected



Subject: MECHANICAL

VAP No.: M1

Item: RADIANT HEATING PANELS

Date: _____

Revision: _____

Related Proposals	Baseline Value \$ 150,000	Savings	
		Capital LCC	Energy O & M

Baseline:

96 ceiling radiant panels (3,200 SF).

28 @ 865 W and 52 @ 1030 W - material/\$110,000. (34.38/SF).

10 Ga front panels - 200/lbs/panel.

Proposed:

1. 14 Ga front panels (120 lbs).
2. Field supplied frames and accessories.
3. Increased supply temperature to 60°C.
4. Panels in cells only.
5. ESWA electric ceiling radiation.
6. Convectors.
7. Inverted ceiling wall fin.
- *8. Warm air heating (vs piping and panels).
9. Reduce capacity (site adaptation).

Savings

	1	2	3	4	5	6	7	8	9
Capital Cost:	\$10,000	8,700	32,000	12,000	60,000	85,000	85,000	110,000*	5,000
Life Cycle Cost:	--	--	--	--	--	--	--	--	--
Classification:	A2	A1	B2	B2	C1	B2	B2	B2	B1



Subject: MECHANICAL

VAP No.: MI

Item: RADIANT HEATING PANELS

Date: _____

Revision: _____

Related Proposals	Baseline Value \$	Savings	
		Capital	Energy
		LCC	O & M

Advantages

Disadvantages

Lighter (120 lbs) (1).

Less resistant to damage (1).

Lower cost (2, 3, 4, 5, 6, 7, 8 & 9).

Quality control (2).

High panel surface temperatures (3).

Difficult to reach (7).

Less secure panels in non cell areas (4).

CSA approval (5).

Less secure (6 & 7).

Control more difficult (8).

Space for ducts (8).

Engineering design (9).



Subject: MECHANICAL

VAP No.: MI

Item: RADIANT HEATING PANELS

Page: _____

Revision: _____

Analysis:

General: The cost to worth ratio of the radiant panels is about 30:1; panels cost \$1,500 each installed but a 1 kw electric heater installed cost \$50. This is an exceptionally high ratio and indicates major cost saving potential.

Alternative 1, 2 and 3 are based on information obtained from a radiant panel supplier.

Item 4 is based on selective application of radiant panels in cells only.

Item 5 is based on costs supplied by Mackay specialties Canada Ltd. and includes for 1" back insulation and a 14 Ga. sheet metal covering - assembly may prove difficult to obtain CSA approval.

Item 8 is based on a comparative cost of panels and piping vs warm air heating.

Item 9 is based on an approximate reduction due to higher outside design temperatures in Warkworth vs the prototype.



October 16, 1985

Hanscomb Consultants Ltd.,
209 St. Paul West, Rm.#200,
Montréal, Québec,
H2Y 2A1


Attention: Mr. Bob Charette

Dear Sir,

In response to our recent telephone conversation, the Norwegian manufacturer is preparing information from their files, concerning ESWA Radiant heat and its use in high security prisons or similar applications. As soon as we get an answer, the information will be forwarded to you.

In the meantime, find enclosed ten product brochures, an installation manual and the letter from Ontario Hydro stating their agreement concerning ESWA's installation on steel decking at Can Car Rail.

Yours truly,


David E. Miller,
V.P. Sales & Marketing

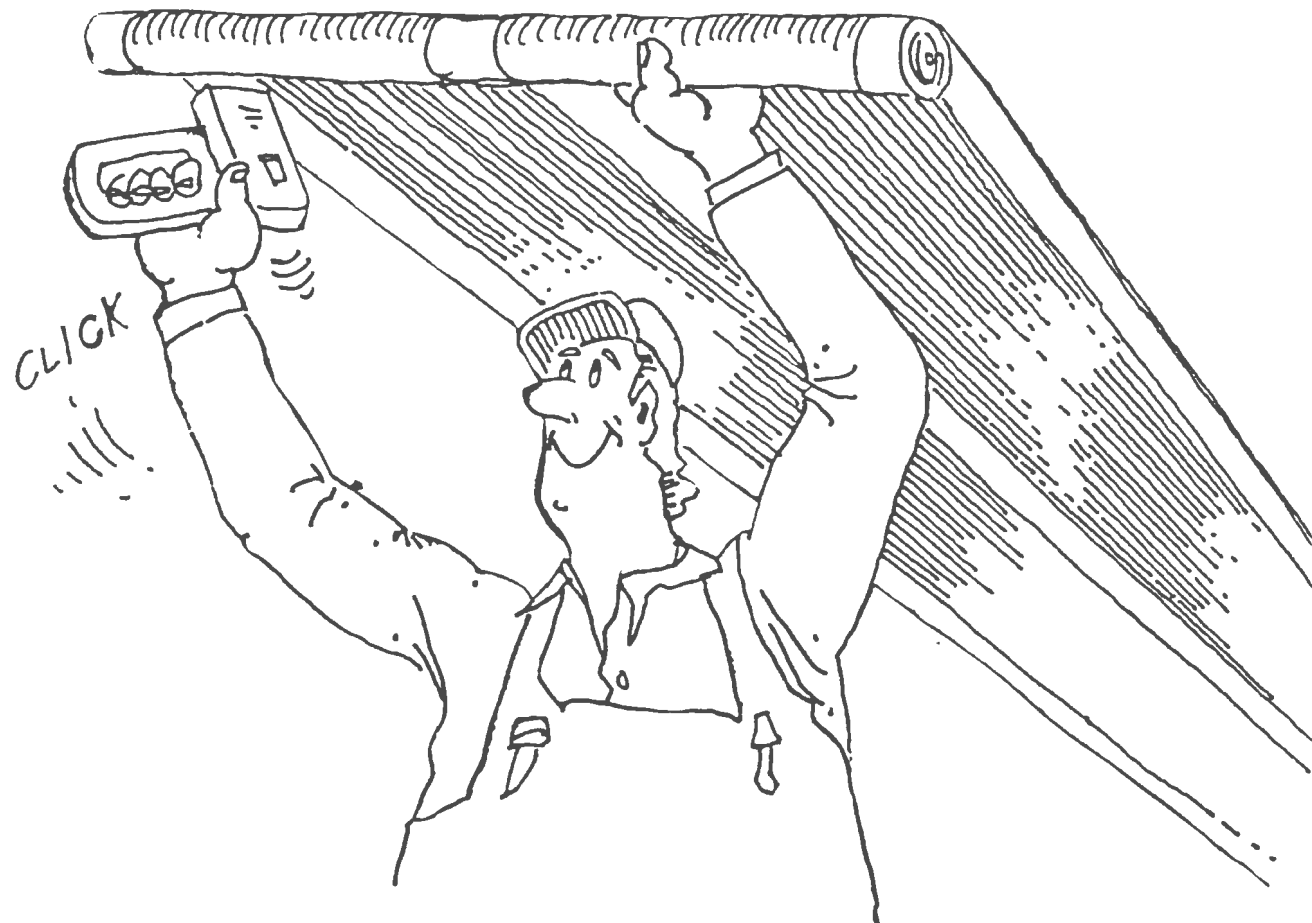
CC: Mr. Ray McKeivitt
W.J.H. Grand.

DEM/dod

ESWA Ceiling Heating System

Système de chauffage en plafond ESWA

Installation Manual
Manuel d'installation



Printed May 1985
Imprimé en Mai 1985

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Norway — Norvège

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LR 56397.

APPROVALS

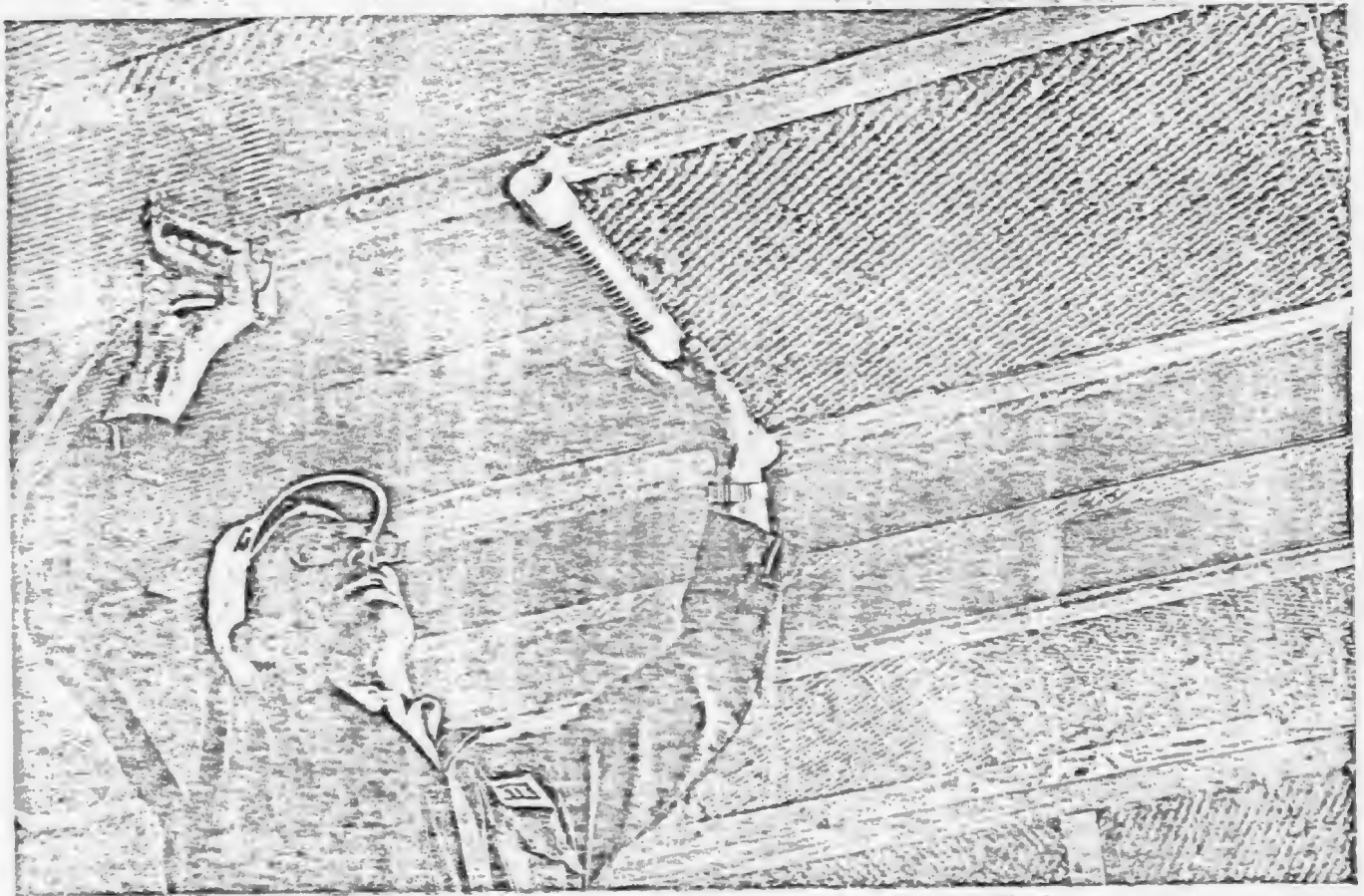
ESWA is approved in the following countries:

Norway:	NVE/NEMKO
Sweden:	SEMKO
Denmark:	DEMKO
Finland:	Elektriska Inspektoratet
Great Britain:	IEE/Agreement
France:	CSTB/LCIE
Netherlands:	KEMA
Belgium:	CEBEC
Switzerland:	SEV
Greece:	Ministry of Industry
Cyprus:	Electricity Department
U.S.A.:	Underwriters Laboratories
New Zealand:	Electricity Department
Canada:	Canadian Standards Association

In other countries where ESWA is sold, it is either not necessary to have national approval or else regulations for approvals are being prepared.

EXPERIENCE

ESWA has been marketed since 1939 and enjoys the reputation of a world leader in the field of electrical heating. The type of element used today has been in production since 1963, since when more than 100 million sq. ft. of room area have been heated by this type of ESWA element.



MACKAY

Mackay Specialties Canada Limited
33 Labatt Avenue
Toronto, Ontario
M5A 1Z1
(416) 368-8396

5400 Industrial Blvd.
Montreal-North, Quebec
H1G 3H4
(514) 327-5417

ITT



700 University Avenue, Toronto, Ontario M5G 1X6

August 22, 1985

OUR FILE: 504.089

Mr. David E. Miller
MacKay Specialties Canada Limited
33 Labatt Avenue
TORONTO, Ontario
M5A 1Z1

Dear Sir:

ESWA Radiant System
CAN-CAR Rail Inc.
Thunder Bay, Ontario

Your proposal to install an ESWA radiant heating system on the existing spray booths located at the above noted company is acceptable.

When the detailed design is completed, please submit your drawings to Mr. I.T. McKenzie, Electrical Inspection Superintendent, Thunder Bay. His mailing address is:

34 North Cumberland Street .
Thunder Bay, Ontario
P7A 4L5.

Yours truly,

A handwritten signature in cursive script, appearing to read 'J.A. Dicker'.

J.A. Dicker, P.Eng.
Manager - Electrical Inspection



Can-Car Rail Inc
Box 67
Thunder Bay
Ontario
Canada
P7C 4V6

Tel. (807)577-8431

July 10, 1985

Mr. David Miller,
Sales and Marketing Manager,
MacKay Specialties Canada Ltd.,
33 Labatt Avenue,
TORONTO, Ontario.
M5A 1Z1

Dear Mr. Miller:

As per your request please find enclosed drawings of two types of Paint Booths installed at Can Car Rail. The overall length of the installed booths (80') is shorter than shown on drawings (100').

I have also enclosed copies of Manufacturer's Specifications on the paint booths and I hope these will be of some assistance to you.

Please do not hesitate to call Steve Osipenko or myself in case you require further information.

Yours sincerely,

A handwritten signature in cursive script that reads "S. Arora".

S. Arora
Supervisor Industrial Eng'g Dept.

Enclosures

cc: S. Osipenko

Telex.
Engineering 073 4365
Materials 073 4308
Administration 073 4560

QUANTITY

DESCRIPTION

2

100' LONG PAINT ARRESTOR BOOTHS

Special booths having inside dimensions of 100' long, 18' wide and 18' high are made from 18 gauge steel panels having rolled edges prepunched for field assembly. Support beams included to provide a free standing structure, capable of supporting customers full length raised work platforms providing weights and load designs are acceptable to DeVilbiss. Equipment shall be shop painted with one coat of beige semi-gloss enamel.

Each booth shall have two paint arrestor exhaust sections 10' wide, 3' deep and 14' high complete with paint arrestors, manometer gauges, outlet adapters, 34" dia. fans each exhausting 10,000 CFM, 3 HP 550/60/3 open type motors, magnetic motor starters, exhaust stacks including discharge cones, stackheads, guy wires, stack bands, clean-out doors, roof flanges, fan supports, motor house and necessary hardware.

Illumination in each booth shall include 72 non vapourproof 4 tube fluorescent fixtures mounted over sealed glass. Service access from outside booth through removeable back panel in each fixture. Tubes and four switches shall be included.

Each end of booths shall have a motorized electrically operated rolling steel door 12'-0" wide and 14'-0" high driven by a 3/4 HP open type motor 550/60/3. Accessories and controls shall include two "open-close-stop" push buttons for each door, one inside booth and one outside booth, bottom safety reversing bar reelite, emergency manual chain operator in case of power failure.

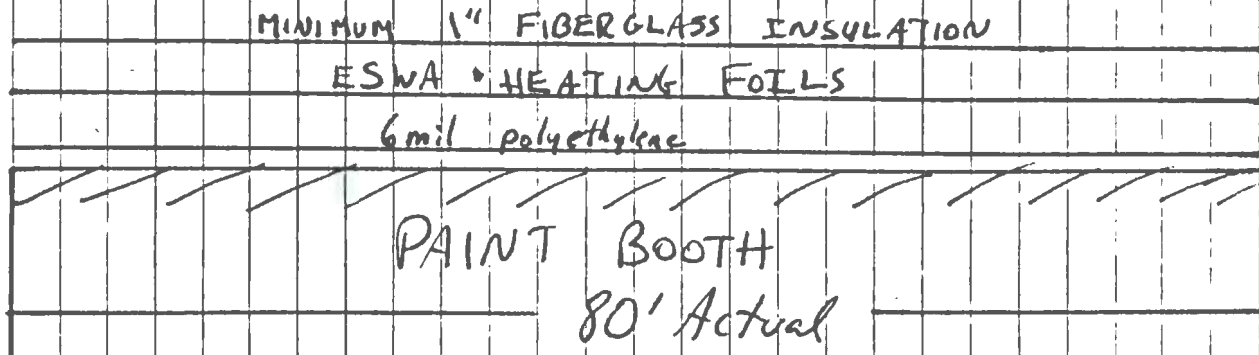
Three access doors 2'-6" wide and 7'-0" high with viewing windows shall be provided on each side of each booth.

Air shall enter booth through disposable 20" X 48" filters mounted in the front end of each side wall.

THE FOLLOWING WORK AND EQUIPMENT IS NOT INCLUDED AS PART OF THIS PROPOSAL AND MUST BE SUPPLIED BY THE PURCHASER.

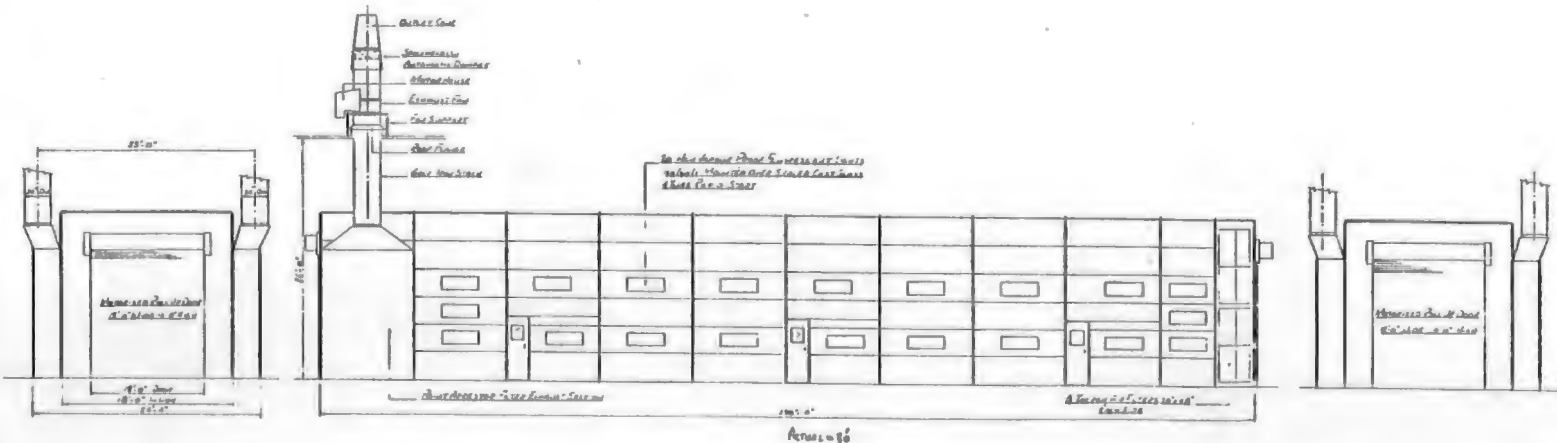
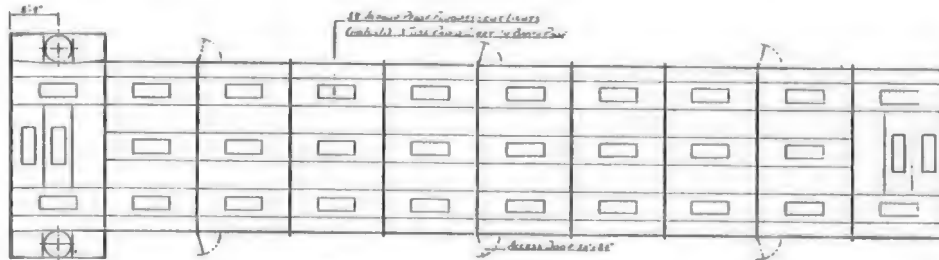
- preparation of jobsite, alterations to building & levelling of floor.
- unloading of equipment & storage space
- install all equipment & provide utilities required for installation work
- roof openings and weather seal
- guy wire anchors
- bring electrical power to equipment terminating in a disconnect switch
- wiring between disconnect, switch gear, motors & lights
- fire protection equipment as required
- all necessary permits and inspections
- work platforms and rework to booth as required

10



10

General Data
 No. 16 - 24 - 1944
 General Data
 24 - 1944



PROJECT: **NEW-DE SOCIETY**
 THE NEW DE SOCIETY

NUMBER: **3-29-53**

DE
 DEVILBISS



Subject: MECHANICAL

VAP No.: M2

Item: HEATING SYSTEM PIPING

Date: _____

Revision: _____

Related Proposals	Baseline Value \$ 87,000	Savings	
		Capital LCC	Energy O & M

Baseline:

Reverse return system with two radiant panels in cell area on one piping/control circuit.

Proposed:

For each wing floor, 2 piping loops or zones (16 zones total) based on horizontal or vertical piping along outside wall (one zone per exposure for each wing floor).

Advantages

Lower cost.
Simpler to install.

Disadvantages

Larger zones for temperature control.

Analysis:

Main savings would come from piping (\$30,000) and a reduction in valves and controls (\$10,000).

Savings

Capital Cost: \$40,000

Life Cycle Cost: --

Classification: B2



Subject: MECHANICAL

VAP No.: M3

Item: HEATING AND VENTILATION SYSTEM/HUMIDIFICATION

Date: _____

Revision: _____

Related Proposals	Baseline Value \$ 74,000	Savings	
		Capital	Energy
		LCC	O & M

Baseline:

Present design indicates a centralized air handling unit with mixing box, filter and electric humidifier (30 kw) arranged to supply ventilation air to each dayroom area. A hot water heating coil is provided in each duct run out. A return air fan is provided for the system which allows 100% air circulation for an economy cycle (see attached drawings M3.1, M2.3 and M2.5). Air is supplied to the control room and passes through a DX cooling coil.

Proposed:

Provide individual air handling units with hot water heating coils, mixing box and filter section for each day room (see attached sketches) - delete humidification (\$4000) - air condition control room with self contained unit.

Advantages

Disadvantages

Reduces cost.

Redesign.

Save energy.

Access to units more difficult.

Improved flexibility.

Reduce roof height to one level

with precast.

Delete central area hung ceiling.

Independent operation of areas.

Additional space above control

room (17 m²).

Savings

Capital Cost: \$31,950

Life Cycle Cost: \$57,142

Classification: B1

Subject: MECHANICALVAP No.: M3Item: HEATING AND VENTILATION SYSTEM/HUMIDIFICATION

Page: _____

Revision: _____

~~The VE team believes that by decentralizing the H & V system significant initial cost savings and energy cost savings can be realized.~~

~~Each individual system is operated only when needed and the total connected horse power is reduced as ductwork and appurtenances are minimized to reduce static pressure. By having individual units the risk of potential trouble caused by a single system breakdown is minimized. The raised roof area over the central control area can be lowered to a uniform roof level (this was provided to accommodate the large air handling unit and return air fan with associated duct work).~~

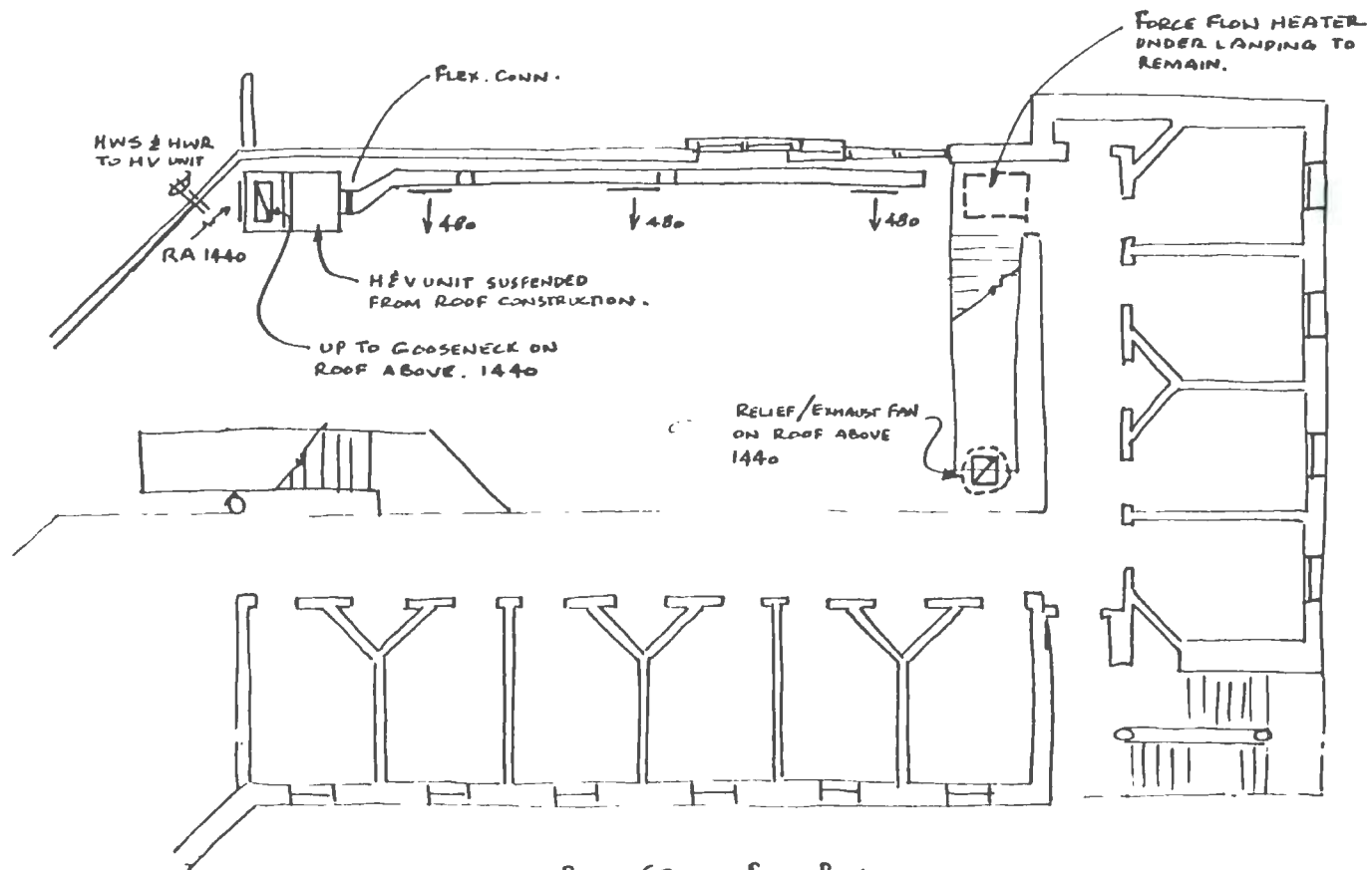
~~The pipework and controls are still required for each heating coil connection in the H & V units and would appear to be a trade off with the duct heating coils in the basic design, including the necessary controls.~~

~~It is recommended that each specially air conditioned space have its own self contained air cooled DX fan coil/air condensing unit to allow the desired use and load control flexibility. Again the central system (basic design) requires operation of a large system to achieve this even for a small room.~~

~~No humidification is provided at Warkworth, and it was felt that it would not be required.~~

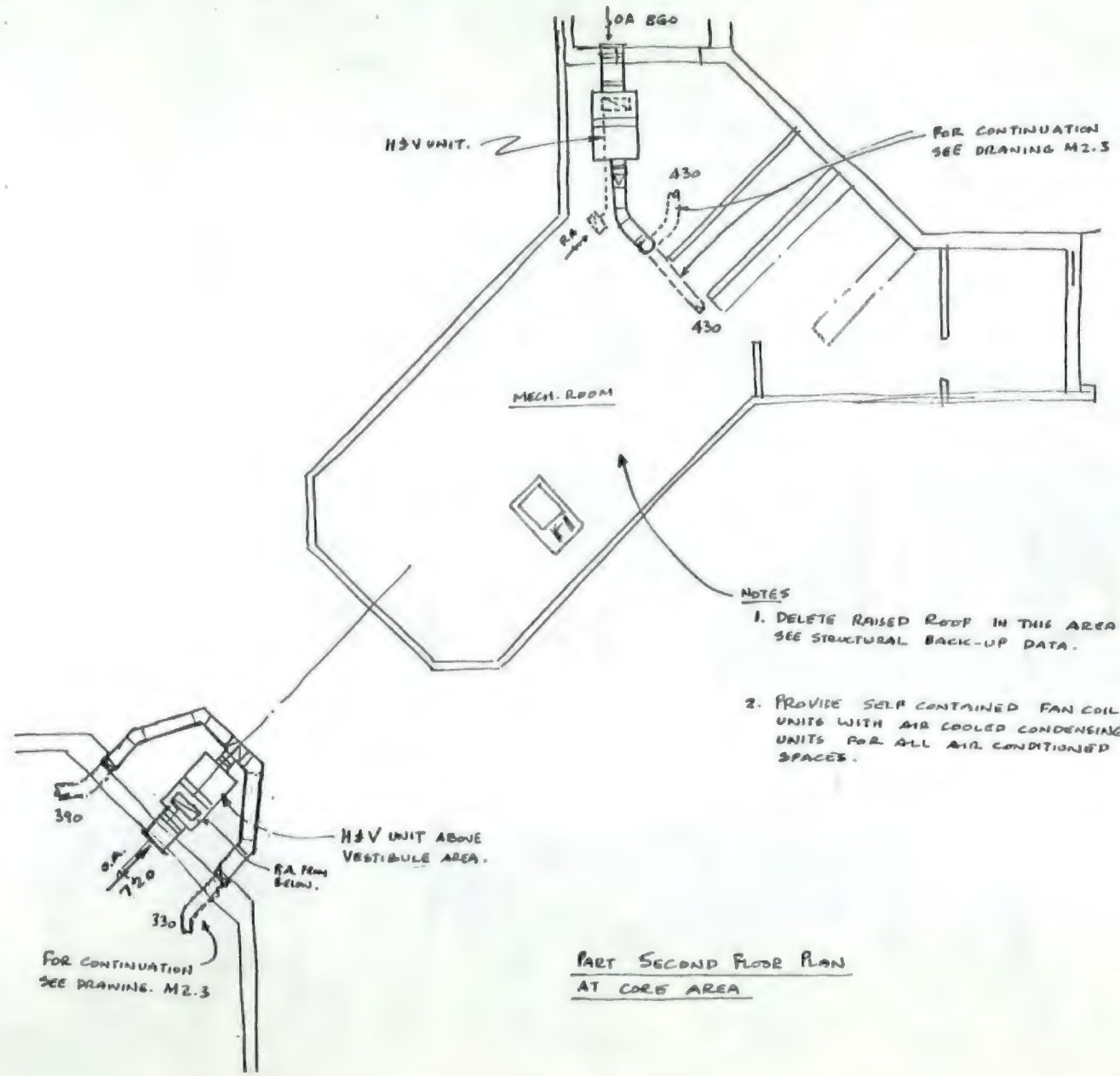
~~The proposal takes a credit or the savings due to a single level roof (see VAP S7.3) but does not show a credit for the additional area available above the control room (17 m²).~~

	QUANTITY	RATE	\$
<u>BASIC DESIGN.</u>			
HEAT GENERATION			27,500
REFRIGERATION.			3,500
AIR DISTRIBUTION			
• AIR HANDLING UNIT			13,000
• HUMIDIFIER			4,000
• SUPPLY DUCT SYSTEM			17,500
• RETURN DUCT SYSTEM			2,500
• RETURN FAN			5,000
• FRESH AIR/EXHAUST AIR DUCTWORK			2,000
			<u>74,000</u>
			18,000
			2,500
			1,000
			92,000
<u>ARCHITECTURAL/STRUCTURAL (DIFFERENCE) (VAP 57.3)</u>			
<u>(SEE ATTACHED ESTIMATE.) CLG ETC.</u>			
			1,000
			1,000
			92,000
<u>PROPOSED CHANGE</u>			
HEAT GENERATION			27,500
REFRIGERATION			5,000
AIR DISTRIBUTION			
• AIR HANDLING UNITS (6 small)			16,800
• HUMIDIFIER			-
• SUPPLY DUCT SYSTEM			7,500
• RETURN DUCT SYSTEM			1,250
• RETURN FAN			-
• FRESH AIR/EXHAUST AIR DUCTWORK			2,000
			<u>60,050</u>
			\$ 60,050
<u>SAVINGS.</u>			
			1,000
			<u>31,950</u>
<u>ENERGY (HEATING ONLY).</u>			
<u>BASIC DESIGN.</u>			
SUPPLY FAN	7.5 KW	$8760 \times \$0.04$	= \$2628
R/A FAN.	5.6 KW	$8760 \times \$0.04$	= 1962
			\$ 4,590
<u>PROPOSED CHANGE</u>			
SUPPLY FANS.	1.0	$6 \times 8760 \times \$0.04$	= \$ 2,102
<u>SAVINGS.</u>			
	2488	22.967 PWF	= \$ 57,142



PART SECOND FLOOR PLAN
TYPICAL OF FOUR WINGS

PROPOSED CHANGE



H3V UNIT.

FOR CONTINUATION
SEE DRAWING M2.3

MECH. ROOM

NOTES

1. DELETE RAISED ROOF IN THIS AREA
SEE STRUCTURAL BACK-UP DATA.
2. PROVIDE SELF CONTAINED FAN COIL
UNITS WITH AIR COOLED CONDENSING
UNITS FOR ALL AIR CONDITIONED
SPACES.

H3V UNIT ABOVE
VESTIBULE AREA.

FOR CONTINUATION
SEE DRAWING. M2.3

PART SECOND FLOOR PLAN
AT CORE AREA



Subject: MECHANICAL

VAP No.: M4

Item: HEAT GENERATION

Date: _____

Revision: _____

Related Proposals	Baseline Value	Savings	
		Capital LCC	Energy O & M
	\$ 27,500		

Baseline:

Two gas fired boilers each rated at 277 kw.

Proposed:

1. Delete boilers and connect to central heating plant.
2. Electric boilers.
3. Reduce capacity (site adapt.).
4. Delete boiler breeching.

Advantages

Nil

Disadvantages

Nil

Savings

Alternatives

	1	2	3	4
Capital Cost:	\$5,000	(6,000)	3,500	1,000
Life Cycle Cost:	--	--	--	--
Classification:	B1	--	B1	B1



Subject: MECHANICAL

VAP No.: M4

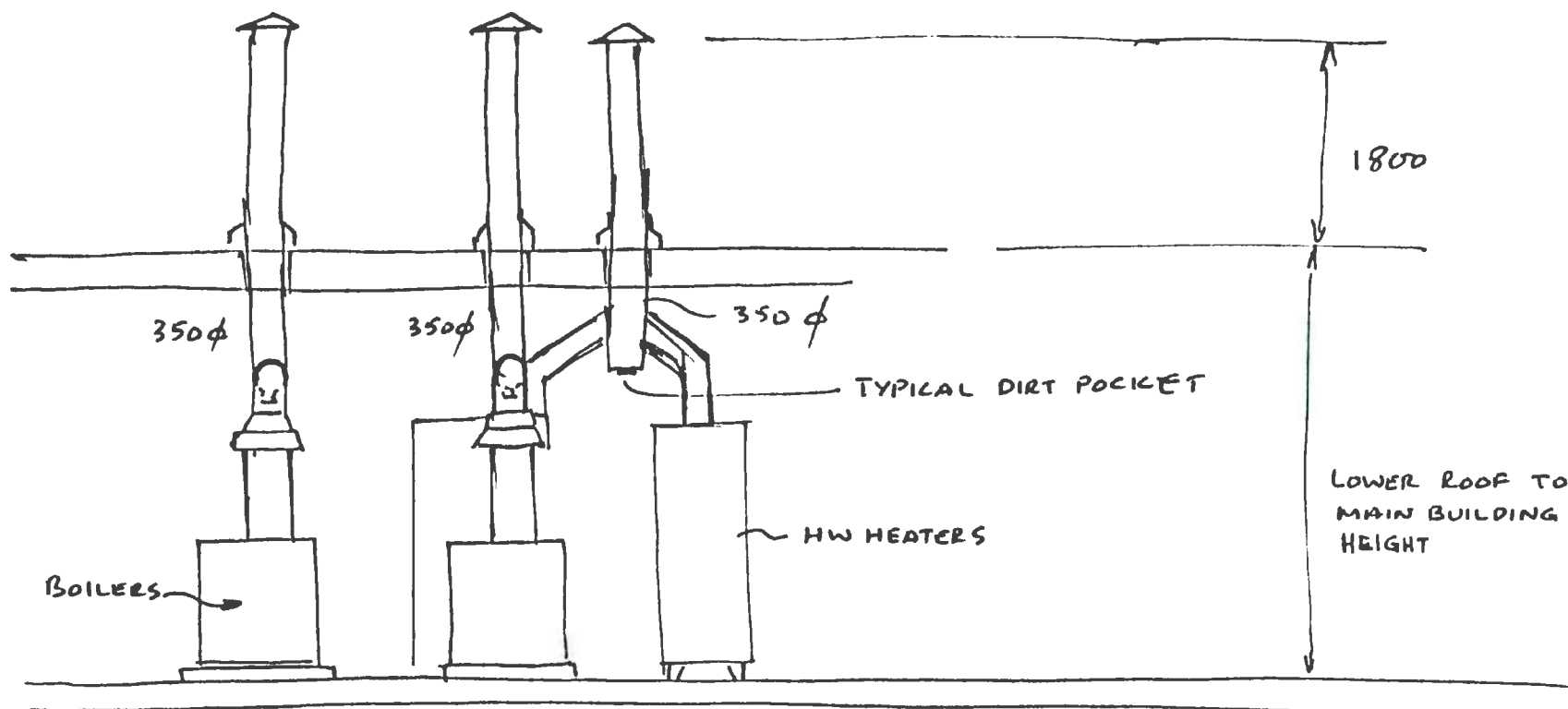
Item: HEAT GENERATION

Page: _____

Revision: _____

Analysis:

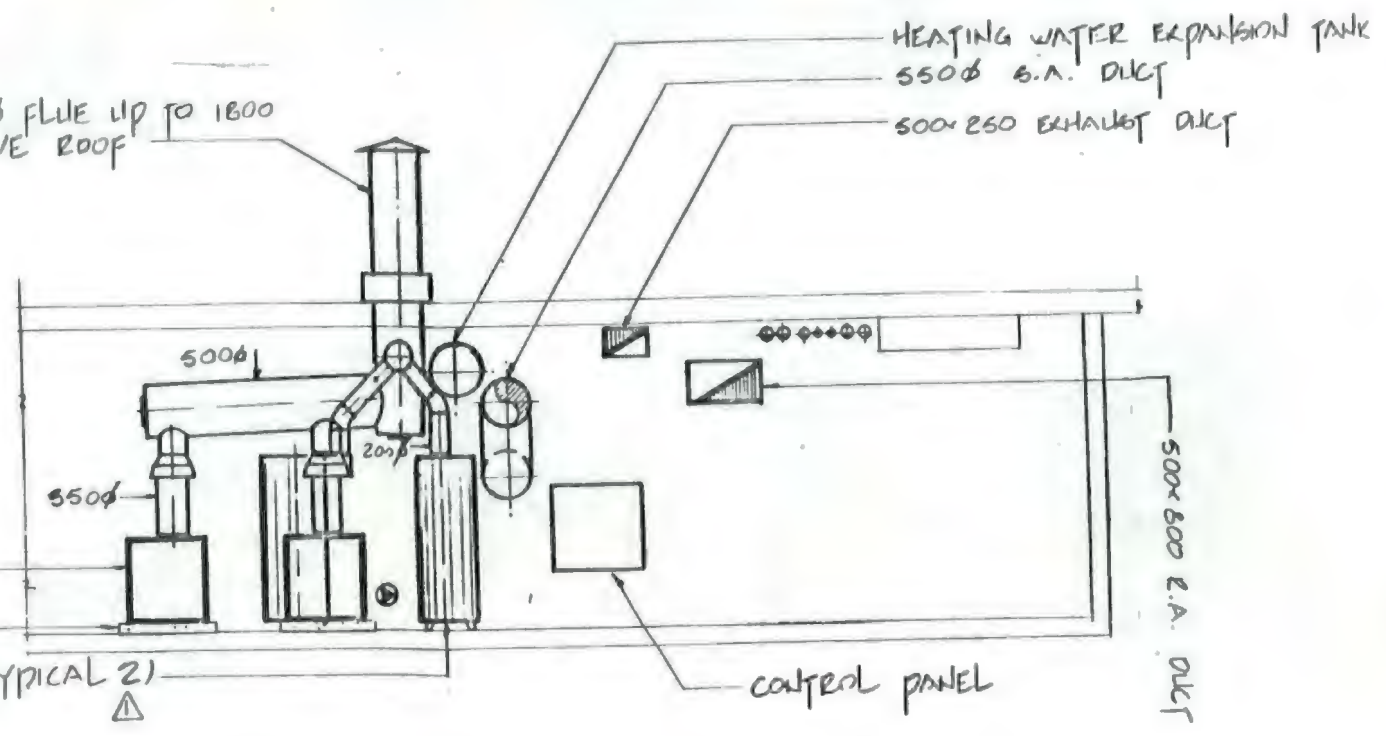
1. Piping from central heating plant available close to building \$20,000 including excavation, piping, control station and heat exchanger.
2. No electric capacity available at Warkworth for electric boilers. Each site should be evaluated, particularly for off peak power at special rates.
3. The design temperature at Warkworth is lower than for the prototype design. Capacities 30% below specified were calculated at a 15% cost reduction.
4. See attached sketches re boiler breeching.



PROPOSED CHANGE

HEATING BOILER
75 HOUSEKEEPING PAD
DOMESTIC HOT WATER HEATER

600φ FLUE UP TO 1800
ABOVE ROOF



(TYPICAL 2)

CONTROL PANEL

500x800 E.A. DUCT

HEATING WATER EXPANSION TANK
550φ S.A. DUCT
500x250 EXHAUST DUCT

B
3.1
SECTION



BASIC DESIGN

Hanscomb

PROJECT WARKWORTH S4 LIVING UNIT.

DATE OCTOBER 3 1985

SHEET NO. _____ OF _____

SUBDIVISION BOILER BREECHING.

	QUANTITY	RATE	\$
<u>BASIC DESIGN. (FROM HANSCOMB ESTIMATE SHEETS)</u>			
BREECHING			2,000
CHIMNEY			<u>2,000.</u>
			\$ 4,000
<u>PROPOSED CHANGE</u>			
FLUES. (350 ϕ).			\$ 3,000
SAVINGS			<u>\$1,000</u>



Subject: MECHANICAL

VAP No.: M5

Item: CONTROLS

Date: _____

Revision: _____

Related Proposals	Baseline Value \$ 62,550	Savings	
		Capital	Energy
		LCC	O & M

Baseline:
 Controls specified are DDC (Direct Digital Control) compatible, i.e. when a central DDC system is installed they may be readily connected to the system at a low cost.

Proposed:
 Delete DDC compatibility.

Advantages	Disadvantages
Lower cost.	Facility will incur a much higher cost to connect to DDC in the future.

Savings

Capital Cost: \$5,000

Life Cycle Cost: --

Classification: A3



Subject: MECHANICAL

VAP No.: M6

Item: HEAT RECOVERY EXCHANGER - SIDE ADAPTATION

Date: _____

Revision: _____

Related Proposals	Baseline Value \$ 5,000	Savings	
		Capital LCC	Energy O & M

Baseline:

A 2800 CFM air to air heat recovery exchanger with cell exhaust air on one side and fresh air supply on the other. Additional power in main air unit fan to overcome static pressure drop.

Proposed:

Delete heat recovery exchanger.

Advantages

Annual energy saving.

Disadvantages

Added capital cost.

Added maintenance.

Payback calculated at 9 years.

Savings

Capital Cost: \$5,000

Life Cycle Cost: --

Classification: B2



Subject: MECHANICAL

VAP No.: M6

Item: HEAT RECOVERY EXCHANGER

Page: _____

Revision: _____

Analysis:

The economics of this unit were calculated on:

- gas at \$5.00/MCF or 2.8¢/kwh net for 60% annual efficiency;
- 7000 degree days;
- 50% annual exchanger efficiency;
- 3000 CFM.

Annual kwh saved per degree day formula - 80,000

Gross Annual saving \$2,241.

Additional fan kwh due to extra static \$4,500 (additional 5 kw to main air unit fan).

Net annual saving \$441.00.

Simple payback 11.3 years.

Time payback based on a i = 12%, e = 10% (from financial tables) is 13 years.



Subject: MECHANICAL

VAP No.: M7

Item: EQUIPMENT ROOM AIR CONDITIONING

Date: _____

Revision: _____

Related Proposals	Baseline Value	Savings	
		Capital LCC	Energy O & M
	\$ 7,000		

Baseline:

A 3.4 kw water cooled air conditioning unit.

Proposed:

Delete air conditioning.

Advantages

Lower cost.

Lower maintenance.

Disadvantages

Higher temperature in space.

Analysis:

Per JSI Consultant, it is likely that the load is so low that ventilation only will be adequate - to be validated by JSI.

Savings

Capital Cost: \$7,000

Life Cycle Cost: —

Classification: B2



Subject: MECHANICAL

VAP No.: M8

Item: CONTROL CENTRE AIR CONDITIONING

Date: _____

Revision: _____

Related Proposals	Baseline Value \$ 3,500	Savings	
		Capital LCC	Energy O & M

Baseline:

The main heating and ventilating unit supplies air to the control centre; a DX coil is inserted in the duct to the control room and an air cooled condensing unit is installed outside.

Proposed:

A self contained water cooled unit at a cost of \$5,000 approximately.

Advantages

Disadvantages

Independent of main unit.

Added cost.

Fixed velocity over DX coils

gives less potential problems.

Note: If the main air unit is changed for four smaller units, a self contained unit is required.

Savings

Capital Cost: (\$1,500)

Life Cycle Cost: —

Classification: —



Subject: MECHANICAL

VAP No. : M9

Item: CELL WC AND BASIN FIXTURES

Date: _____

Revision: _____

Related Proposals	Baseline Value \$ 112,000	Savings	
		Capital LCC	Energy O & M

Baseline:

Institutional type procelain fixtures - 2 pieces.

Proposed:

One piece stainless steel.

Advantages

Longer life.

Resistant to abuse.

Disadvantages

Higher cost.

Savings

Capital Cost: (\$40,000)

Life Cycle Cost: --

Classification: --



Subject: MECHANICAL

VAP No.: M10

Item: UNDERFLOOR PIPE FOR SANITAITON AND DRAINAGE

Date: _____

Revision: _____

Related Proposals	Baseline Value \$ 20,500	Savings	
		Capital LCC	Energy O & M

Baseline:
Cost iron.

Proposed:
P.V.C.

Advantages	Disadvantages
Lower cost.	More susceptible to damage.

Savings

Capital Cost: \$5,000

Life Cycle Cost: --

Classification: A3



Subject: MECHANICAL

VAP No.: M11

Item: DOMESTIC HOT WATER HEATERS

Date: _____

Revision: _____

Related Proposals	Baseline Value	Savings	
		Capital LCC	Energy O & M
	\$ 4,000		

Baseline:

2 X 106 kw, 1371 litre tanks (200 gal.), gas fired.

Proposed:

Storage tank c/w heat exchanger and heating from main boilers.

Advantages

Disadvantages

There is no cost advantage or other perceptible advantage for this alternative.

Nil

Savings

Capital Cost: --

Life Cycle Cost: --

Classification: --



Subject: MECHANICAL

VAP No.: M12

Item: COLD WATER SUPPLY

Date: _____

Revision: _____

Related Proposals	Baseline Value \$ 37,800	Savings	
		Capital LCC	Energy O & M

Baseline:

Water meter at supply inlet and insulated copper piping.

Proposed:

- Delete meter
- Reduce pipe sizes based on the nature of the water demand.*

Advantages

Disadvantages

Lower cost (1).

Cannot monitor water consumption (1).

Lower cost (2).

Difficult to obtain code exemption (2).

*It is recognized that codes are antiquated in some cases and piping oversized - ASTM has already initiated certain changes to their standards, notably for residences.

Savings	Alternatives	
	1	2
Capital Cost:	\$1,250	6,000
Life Cycle Cost:	--	--
Classification:	A1	B1



Subject: MECHANICAL

VAP No.: M13

Item: STORM WATER DRAINS

Date: _____

Revision: _____

Related Proposals	Baseline Value 28,400 \$	Savings	
		Capital LCC	Energy O & M

Baseline:

21 roof drains, cast iron piping.

Proposed:

1. Reduce no of roof drains by 50%.
2. P.V.C. underfloor pipe.
3. Scuppers instead of downpipes.
4. Relocation of roof drains.

Advantages

- Lower cost (1, 2 & 3).
- Simplifies piping (4).

Disadvantages

- None if meets criteria (1).
- More susceptible to damage (2).
- Less aesthetic (3).
- May complicate roof levels design (4).

Savings

Alternatives

	1	2	3	4
Capital Cost:	\$7,000	3,400	27,000	1,400
Life Cycle Cost:	--	--	--	--
Classification:	B2	A1	B2	B2



Subject: MECHANICAL

VAP No.: M14

Item: STANDPIPES HOSES & SPRINKLERS

Date: _____

Revision: _____

Related Proposals	Baseline Value \$ 60,000	Savings	
		Capital LCC	Energy O & M

Baseline:

- Proposed:**
1. Delete standpipe and hose (site adaptation).
 2. Combine standpipe and sprinklers.
 3. Delete hang proof sprinklers (sidewall).
 4. Polypropylene sprinkler piping.

Advantages	Disadvantages
Reduced cost (1, 2, 3 & 4).	Reduces security (1 & 3). Code requirements (4).

Savings	Alternatives			
	1	2	3	4
Capital Cost:	\$20,000	8,000	5,000	6,000
Life Cycle Cost:	--	--	--	--
Classification:	A1	B1	A2	B3

Subject: MECHANICAL

VAP No.: M14

Item: RADIANT HEATING PANELS

Page: _____

Revision: _____

Analysis:

1. Standpipe and hoses could be deleted at Warkworth if fire department response better - could be done at other sites.

3. Standard sprinklers in cells appears consistent with other security features.

4. Polypropylene is likely be difficult to have approved, today, but this could change in the future.



Subject

Date

Project No.

Drawn By

WASHINGTON POST.

APRIL 28 1984

Marriott Uses Sprinklers Made of Plastic Pipe

By Gayle Young

Special to The Washington Post

The Marriott Corp. burned down a hotel in Fort Lauderdale last spring.

Then it burned another in San Francisco last fall.

The instances of premeditated arson were actually tests to prove to fire officials throughout the country that a new type of sprinkler system using plastic pipe is as good, if not better, than traditional systems of black iron.

Marriott is the midst of a massive effort to retrofit one-third of its 131 hotels with the heat-resistant plastic sprinkler piping, which costs half as much as black iron piping. When the chain is finished in 1986, all of its hotels will have the new sprinkler systems and fire alarms in each room, say officials.

"The benefits are twofold," Marriott spokesman Robert T. Souers said. "First and foremost is the safety of our guests. But it also makes good business sense to minimize your damage in case of fire."

Marriott is the first to use the plastic polybutylene (PB for short) piping extensively in sprinkler systems in the country, and fire marshals, local governments and industry officials are watching the project closely.

The plastic piping could be a real boon in the construction and hotel industry, now juggling the cost of human life against the cost of expensive fire safety equipment. Concern about fire safety has grown, especially in the wake of several major hotel fires in the past few years.

Souers said convention planners often ask about fire safety measures when they inquire about hotel accommodations and rates.

PB pipes can be installed in a day, compared with the week it takes to install black iron piping, which first must be constructed in a forge and then brought to the site for fitting. The plastic piping also costs between 20 and 30 percent less than black iron, said Souers.

"In 1980 it took 14 days to retrofit [install sprinkler systems in] 30 hotel rooms in Chicago at a cost of \$1,550 a room using black iron," said Souers. "Using polybutylene it takes us four days to retrofit 30 rooms at a cost of \$800 a room, or approximately half the cost."

However, some experts still question the durability of the plastic pipes, which have taken some heat from the iron industry. In earlier tests PB pipe was distorted under intense heat, but now tests show that quick action sprinkler heads can reduce heat and all but eliminate the chance of distortion, said Frank Corbin, spokesman for a plastics industry trade association.

And the National Bureau of Standards, which monitored the Marriott fire tests, has come out in favor of the plastic piping, calling it an excellent substitute for black iron, say spokesmen there.

But few real estate owners other than Marriott have opted to use the PB piping, and last year the General Services Administration rejected the idea of installing plastic pipe sprinkler systems in federal buildings because, spokesmen said, the National Fire Protection Association only recommends black iron pipes.

"We pretty much follow the lead of the National Fire Protection Association, which does not permit PB piping at this time—perhaps because of the heat distortion," said William R. Lawson, an assistant GSA commissioner. "But the new sprinkler heads may change all that. I believe polybutylene pipe is on the advent of being adopted nationwide, but we will wait for a green light."

Most fire codes, which vary from locality to locality, were written before the PB pipe came on the market in the late 1970s, and few have provisions for use of the pipe. Marriott's test fires in Fort Lauderdale and San Francisco were conducted in part to persuade fire marshals to amend the fire codes in cities where Marriott has hotels yet to be retrofitted, and the result has been positive, said Souers. He said codes either have been amended or fire marshals have approved use of the pipe on a case by case basis.

Locally, Marriott's 10 hotels either already have sprinkler systems or are being retrofitted with the plastic pipe with the approval of local fire marshals.

The heat-resistant PB pipe was discovered 10 years ago, said Corbin, and was first tested at the University of Maryland. It has been marketed for the past three years, he said.

Shell Oil Co. manufactures the polybutylene resin used to make the pipes, which are produced by a number of different companies, he said. B.F. Goodrich manufactures another resin, chlorinated polyvinyl chloride, which also is used to make piping for sprinkler systems, he said.



Subject: MECHANICAL

VAP No.: M15

Item: SITE SERVICES

Date: _____

Revision: _____

Related Proposals	Baseline Value \$ 56,000	Savings	
		Capital LCC	Energy O & M

Baseline:

8" piping - two loops around building connection to existing services.

Proposed:

1. Reduce piping size to 6".
2. Delete one side of loop.
3. Reroute proposed loop with no conneciton to exterior loop.

Advantages

Reduced cost (1, 2 & 3).

Reduced O&M.

Disadvantages

May not conform to code requirements (1, 2 & 3).

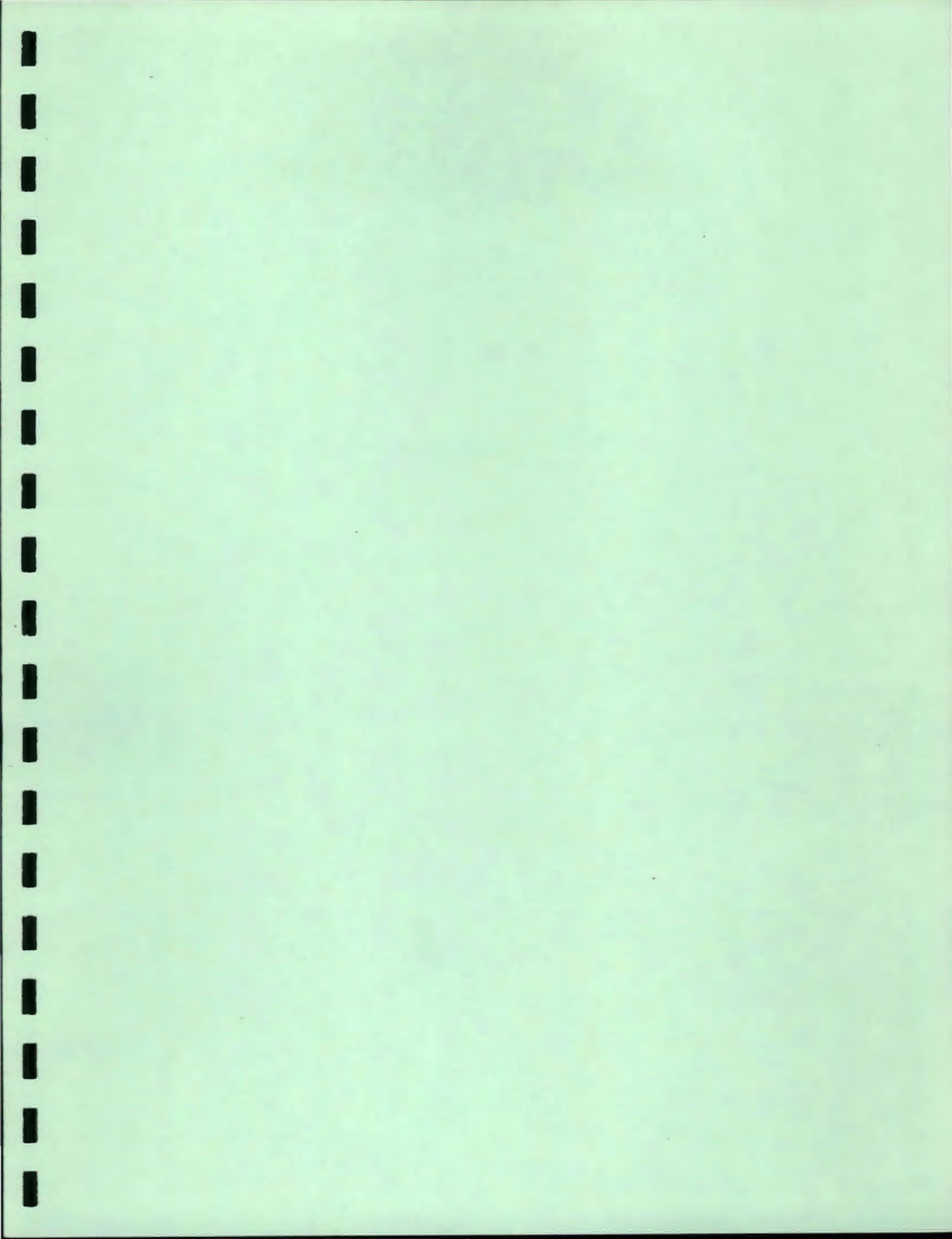
Fire Marshall may object.

Savings

Alternatives

	1	2	3
Capital Cost:	\$5,000	3,000	2,900
Life Cycle Cost:	--	--	--
Classification:	B2	B2	B2

5. ELECTRICAL VAP





SUMMARY OF VALUE ANALYSIS PROPOSALS

Section: SUMMARY OF ELECTRICAL VAP

VAP No.	V A P	Baseline Value	Savings (Increase)		Class.
			Capital	O&M(PV)	
Services & Distribution					
E1	Delete metering.	1,000	1,000	--	A2
E2	Redesign distribution (transformers).	65,150	13,700	36,170	C2
E3	Reduce service capacity:				
	1. To 200 A	--	7,000	--	C2
	2. To 100 A	--	*10,500	--	C3
E4	Delete (2) two manual transfer switches (included in VAP E2).	--	--	--	--
E5	Delete provision for standby generator.	1,000	1,000	--	A1
E6	Reduce panels or total no of breakers in panels boards.	8,550	2,550	--	A2
Lighting & Power					
E7	Delete/reduce dimmers.	10,000	9,850	--	A2
E8	Reduce no of receptacles in cells.	23,600	1,600	--	A2
E9	Reduce no of receptacles circuits in cells.	12,000	7,800	--	A2
E10	Delete ground fault protection on cell receptacles.	6,000	5,400	--	A2
E11	Reduce no of lighting fixtures in offices.	2,000	1,000	--	A1
E12	Simplify type 'A' lighting fixture.	19,050	6,000	--	A2
E12A	Reduce no of type 'A' lighting fixtures outside of cells.	*7,680	1,920	14,500	A1
E13	Reduce no of type 'L' fixtures.	15,120	7,260	16,100	A1
E14	Reduce wattage of type 'L' fixtures:	*15,120	--	--	--
	1. 30 fixtures	--	1,200	*12,075	A2
	2. 15 fixtures	--	*600	*6,040	A3
E15	Change type 'L' fixtures to H.P.S. from H.I.D.	*15,120	*1,200	*12,075	A2
		--	* 600	*6,040	A3
E16	P.V.C. rigid pipe in concrete	25,000	7,500	--	A2

A - Accepted, P - Pending, R - Rejected

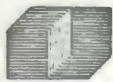


SUMMARY OF VALUE ANALYSIS PROPOSALS

Section: SUMMARY OF ELECTRICAL VAP

VAP No.	V A P	Baseline Value	Savings (Increase)		Class
			Capital	O&M(PV)	
E17	Not allocated.	--	--	--	--
E18	Delete C.C.T.V. system	1,245	1,245	--	A2
E19	Delete 5 clock outlets	1,500	1,000	--	A2
E20	Delete all speakers in front of cells	6,100	2,750	--	A1
E21	Delete lighting protection	17,000	15,000	--	A2
E22	P.V.C. rigid conduit in concrete walls & slabs in lieu of E.M.T.	33,800	10,140	--	A2
E23	Combine conduit for various systems	*61,345	*15,000	--	B2
E24	Reroute electrical ducts (site)	37,375	26,375	--	A1
E25	Reduce no of ducts (site)	10,000	3,600	--	A2
E26	Reduce feeder size	18,000	--	--	--
	1. 200 A	--	7,200	--	C2
	2. 100 A	--	*10,800	--	C3
E27	Direct buried ducts in lieu of encased:				
	1. As drawings	*34,325	*12,000		C3
	2. If VAP E.24 & E.25 incorporated	*22,285	*5,000		C3
	TOTALS (* not included)	374,835	155,890	66,770	

A - Accepted, P - Pending, R - Rejected



Subject: ELECTRICAL

VAP No.: E1

Item: METERING

Date: _____

Revision: _____

Related Proposals	Baseline Value	Savings	
		Capital LCC	Energy O & M
	\$ 1,000		

Baseline:

Metering in distribution board cost \$1,000. (cost of P.T.S. & C.T.S.). This is not a mandatory item.

Proposed:

Delete metering at S4 board.

Advantages

Lower cost.

Disadvantages

Exact energy use of building not known.

Savings

Capital Cost: \$1,000

Life Cycle Cost: _____

Classification: A2



Subject: ELECTRICAL

VAP No.: E2

Item: DISTRIBUTION

Date: _____

Revision: _____

Related Proposals	Baseline Value	Savings	
		Capital LCC	Energy O & M
	\$ 65,150		

Baseline:

As drawn.

Proposed:

1. Redesign distribution and delete:

1 - 300 KVA transformer (600/600V);

1 - 150 KVA transformer (600/600V).

2. Add one 75 KVA transformer (600/600V).

Advantages

Disadvantages

Lower cost.

Nil

Simpler board.

Reduced transformer power losses.

Analysis:

Power losses in the transformers are about 1½%. By reducing transformers capacity by 300 kw, the resulting annual power saving is \$1,575.

Savings

Capital Cost: \$13,700

Life Cycle Cost: \$36,170

Classification: C2

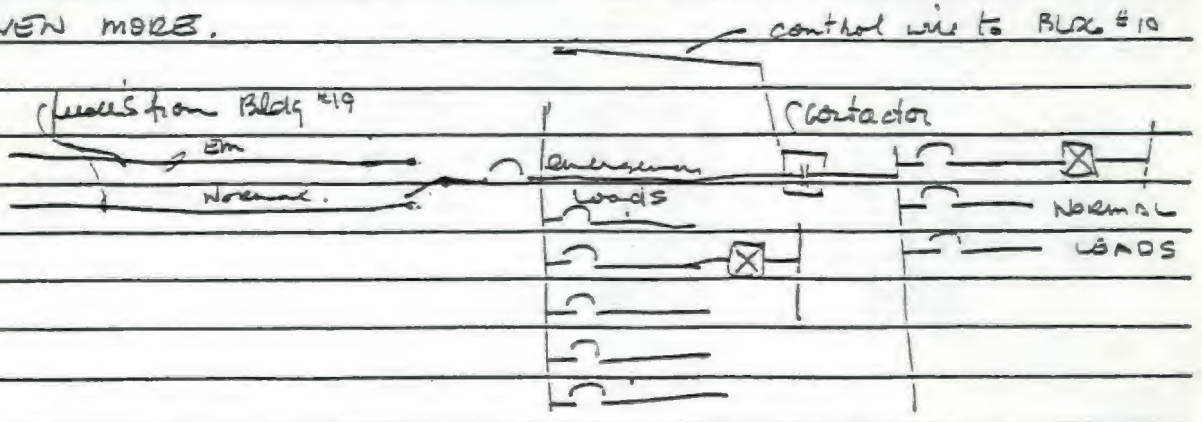
Person responsible for estimate: A. C. WRIGHT

Estimate Summary: Alternate 'A'

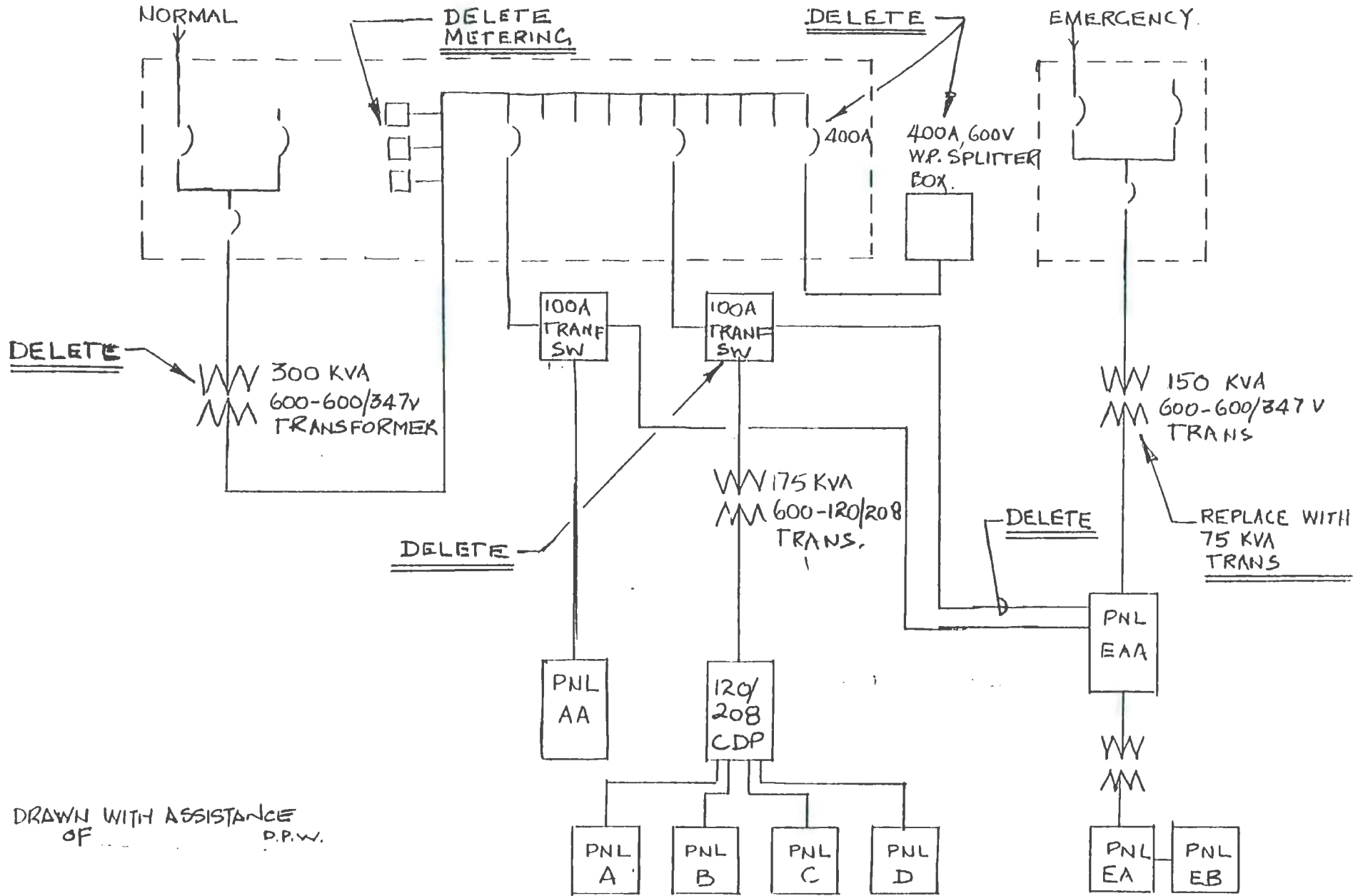
SWITCHBOARD COST	17,000	=	17,000
DELETE 1-400AMP BRKR		(=)	(2000)
1-100 AMP BRKR		((450)
TRANSFORMERS 1-300 KVA			9000
" 1-150 KVA			5000
RDD 1-75 KVA			(3000)
			<u>\$13,450</u>
FEEDERS ETC.			250
			<u>\$13,700</u>

Alternate 'B'

Normal feeder can be switched to emergency at Building #19 arrange Board with emergency board in section 'A' and normal loads in section B - ALTERNATE 'B' WOULD REDUCE COST EVEN MORE.



- Attach Hanscomb Summary Sheets E2, E3A & E4A with supporting details where appropriate.
- Establish cost models as required.
- Estimate or obtain operations and maintenance costs.



DRAWN WITH ASSISTANCE
OF P.P.W.

POWER RISER DIAGRAM.

V&P EC



Subject: ELECTRICAL

VAP No.: E3

Item: SERVICE CAPACITY

Date: _____

Revision: _____

Related Proposals	Baseline Value \$ 65,150	Savings	
		Capital LCC	Energy O & M

Baseline:

400 amp., 3 phase, 3 wire, 600 V.

Proposed:

1. Reduce service capacity to 200 amp.
2. Reduce service capacity to 100 amp.

Advantages

Lower cost.

Disadvantages

Cannot tie into future 400 amp. loop.

~~Savings~~

~~Alternatives~~

	1	2
Capital Cost:	\$7,000	10,500
Life Cycle Cost:	---	---
Classification:	C2	C3



Person responsible for estimate: A.C. WRIGHT

Estimate Summary:

Cost of DISTRIBUTION AS SHOWN 65,150
@ 400 Amp.

A) To Reduce to 200 Amp

Main Board Savings (3500)

TRANSFORMERS / PANELS

FEEDER / SWITCHES (3500)

ETC.

TOTAL SAVINGS (7000)

B) To Reduce to 100 Amp

ESTIMATED SAVINGS

50% OF 'A'

(3500)

+7000

10500

- Attach Hanscomb Summary Sheets E2, E3A & E4A with supporting details where appropriate.
- Establish cost models as required.
- Estimate or obtain operations and maintenance costs.



Subject: ELECTRICAL

VAP No.: E4

Item: MANUAL TRANSFER SWITCHES

Date: _____

Revision: _____

Related Proposals	Baseline Value	Savings	
		Capital	Energy
		LCC	O & M
	\$ --		

Baseline:

2 manual transfer switches.

Proposed:

Covered under VAP E2.

Advantages

Nil

Disadvantages

Nil

Savings

~~Capital Cost:~~ _____

~~Life Cycle Cost:~~ _____

~~Classification:~~ _____



Subject: ELECTRICAL

VAP No.: E5

Date: _____

Item: PROVISION FOR STANDBY GENERATOR

Revision: _____

Related Proposals	Baseline Value \$ 1,000	Savings	
		Capital	Energy
		LCC	O & M

Baseline:

400 amp., 3 phase, 3 wire exterior connection box for connection of portable emergency diesel generator.

Proposed:

Delete total provision and connect at building #19 only (no portable generator located at this site).

Advantages

Lower cost.

Disadvantages

No back up for back up system.

~~Savings~~

~~Capital Cost: \$1,000~~

~~Life Cycle Cost: --~~

~~Classification: A1~~



Subject: ELECTRICAL

VAP No.: E6

Item: PANEL BOARDS AND BREAKERS

Date: _____

Revision: _____

Related Proposals	Baseline Value	Savings	
		Capital LCC	Energy O & M
	\$ 8,550		

Baseline:

Panels A.B.C. full panel boards.

Proposed:

VAP E10 deletes 60 total cell receptacle circuits. Therefore, delete panel 'C'.

Advantages

Disadvantages

Lower cost.

Nil

~~Savings~~

~~Capital Cost:~~ \$2,550

~~Life Cycle Cost:~~

~~Classification:~~ A2



Subject: ELECTRICAL

VAP No.: E7

Item: FLUORESCENT AND INCANDESCENT DIMMERS

Date: _____

Revision: _____

Related Proposals	Baseline Value \$ 10,000	Savings	
		Capital	Energy
		LCC	O & M

Baseline:

3 - 2.4 kw fluorescent dimmers.

3 - 2.4 kw incandescent dimmers.

Proposed:

Delete dimmers and provide for incandescent dimmer in guard centre - for future track and local dimmers for 25% fluorescents.

Advantages

Lower cost.

Reduced dimmer power losses.

Disadvantages

Cannot dim all fixtures shown, but fixtures on multi-level switching.

~~Savings~~

~~Capital Cost: \$9,850~~

~~Life Cycle Cost: ---~~

Classification: A2

Person responsible for estimate: A.C. WRIGHT

Estimate Summary: DELETE / REDUCE DIMMERS

TOTAL COST OF DIMMERS DELETE \$ 10,000

ADD PROVISION FOR INCANDESCENT LOCAL DIMMER IN GUARD STATION (OVERSIZE BOXES ONLY) 2x25 = \$50.

FLUORESCENT DIMMERS LOCAL CONTROL 4 - 2LAMP BALLAST 4x50 = 200

MASTER CONTROLLER IN Panel = 200

TOTAL COST. \$ 450.

INCANDESCENT DIMMER FOR NIGHT LIGHTS IN CELLS DELETE - (NOT USED IN BOWDEN)

TOTAL SAVINGS. 10,000 - 450 = 9,650

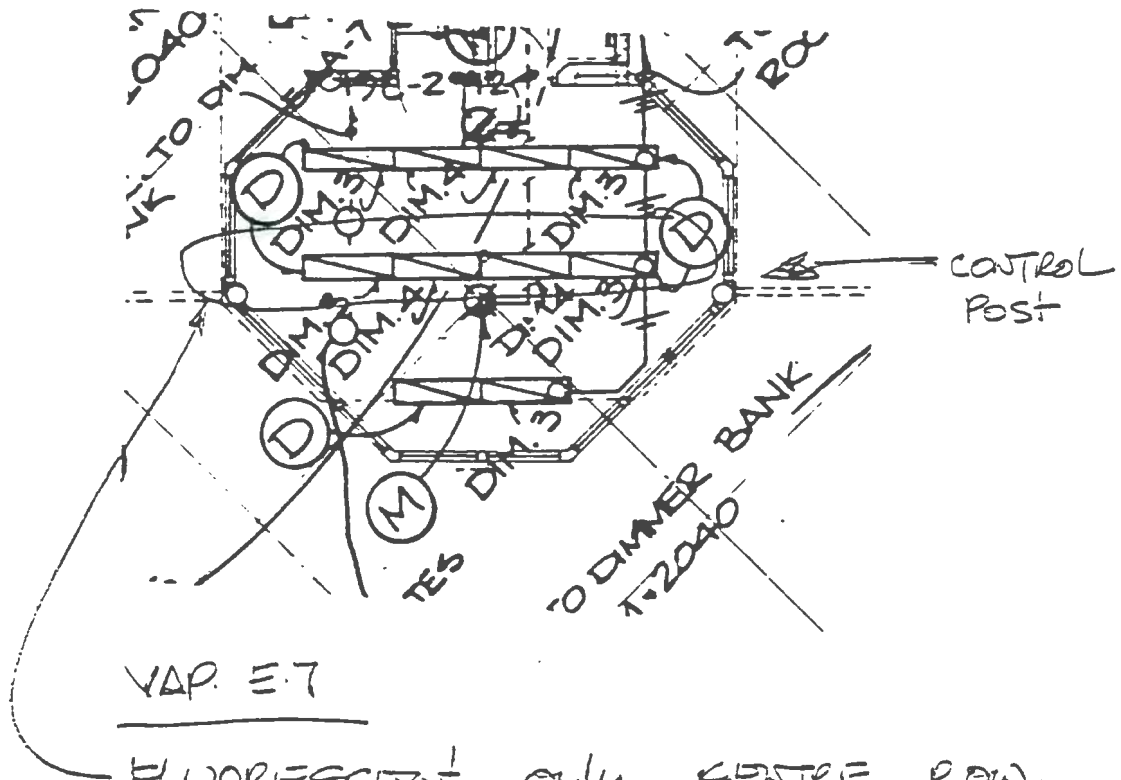
WIRING SAVING TO CELLS - 200 200

9,850

- Attach Hanscomb Summary Sheets E2, E3A & E4A with supporting details where appropriate.
- Establish cost models as required.
- Estimate or obtain operations and maintenance costs.

VAP # E.7 & E.11

VAP E.11
REDUCE NO OF FIXTURES (FLUO)
FROM 10 TO 7.



FLUORESCENT ONLY CENTRE ROW.
(4 FLUORESCENT DIMMING BALLASTS)
1 MASTER CONTROLLER.

PROVISION ONLY FOR INCANDESCENT
DIMMER (NO INCANDESCENT TRACK IN
CONTRACT)

LIGHTING LEVEL, CONTROL POST 85 F.C. APPROX.
AS SHOWN, REDUCE LIGHTING LEVEL
REMOVE 3 FLUORESCENT FIXTURES.

$$\frac{7}{10} \times 85 \text{ F.C.} = 60 \text{ F.C.}$$

TECHNICAL CRITERIA - 4.7 (INTERIOR LIGHTING)



Subject: ELECTRICAL

VAP No.: E8

Item: CELL RECEPTACLES

Date: _____

Revision: _____

Related Proposals	Baseline Value	Savings	
		Capital LCC	Energy O & M
	\$ 23,600		

Baseline:

2 receptacles per cell - 160 total.

Proposed:

Reduce to 1 per cell or 80 total.

Advantages

Lower cost.

Away from sink less need for ground fault protection.

Disadvantages

No shaving outlet at sink location.

Addition of second mirror.

~~Savings~~

~~Capital Cost: \$1,600~~

~~Life Cycle Cost:~~

~~Classification: A2~~



Person responsible for estimate: D.C. WRIGHT

Estimate Summary:

(REDUCE NO. OF RECEPT'S IN CELLS

TOTAL VALUE BASELINE 13 600 (recept's) + 10,000 (conduit & wires)

AVERAGE COST $\frac{23,600}{160} = 147.50$ EACH

DELETE 1 BOX, CONDUIT 6', Recept' etc.
= \$25 EACH INSTALLED

\$ 35 X 80 = \$ 2800

ADD COST OF 2ND MIRROR (S.S.)
\$ 15 X 80 = 1200

NET SAVINGS 2800 - 1200 = \$ 1600

- Attach Hanscomb Summary Sheets E2, E3A & E4A with supporting details where appropriate.
- Establish cost models as required.
- Estimate or obtain operations and maintenance costs.



Subject: ELECTRICAL

VAP No.: 89

Item: CELL RECEPTACLE CIRCUITS

Date: _____

Revision: _____

Related Proposals	Baseline Value	Savings	
		Capital LCC	Energy O & M
	\$ 12,000		

Baseline:

2 receptacles per cell on single circuit wiring.
 2 wires per circuit.

Proposed:

Connect 4 cells/8 receptacles per circuit.

Advantages

Less wiring.
 Less conduit.

Disadvantages

4 cells on same circuit.

Savings

~~Capital Cost:~~ \$7,800

~~Life Cycle Cost:~~ _____

~~Classification:~~ A2



Person responsible for estimate: A. C. WRIGHT

Estimate Summary:

Reduce No. of circuits to recreate in Cells.

Presently 1 cct per cell
proposed 4 cct per 4 cells.

Conduit & Wiring Cost = 12,000

Reduction of wire 75% wire 4000 x .25 = 1000
100% Conduit 6000 x .40 = 2400

Revised cost 1000 + 3200 = 4200

Net Savings 12,000 - 4200 = \$ 7800

- Attach Hanscomb Summary Sheets E2, E3A & E4A with supporting details where appropriate.
- Establish cost models as required.
- Estimate or obtain operations and maintenance costs.



Subject: ELECTRICAL

VAP No.: E10

Item: GROUND FAULT PROTECTION RECEPTACLES

Date: _____

Revision: _____

Related Proposals	Baseline Value	Savings	
		Capital LCC	Energy O & M
	\$ 6,000		

Baseline:

All breakers on cell receptacles presently protected by ground fault breakers:

\$75 each X 80 = \$6,000

Proposed:

Change to normal single pole breakers: \$7.50 each X 80 = \$600

Advantages

Lower cost.

Disadvantages

Does not cut off circuit on fault on ground.

(Note: Receptacles still switched in mechanical space)

~~Savings~~

~~Capital Cost: \$5,400~~

~~Life Cycle Cost:~~

~~Classification: A2~~



Subject: ELECTRICAL

VAP No. : E11

Date: _____

Item: FLUORESCENT LIGHTING FIXTURES - OFFICES

Revision: _____

Related Proposals	Baseline Value \$ 2,000	Savings	
		Capital LCC	Energy O & M

Baseline:

2 - 4 lamp 2' X 4' recessed fluorescent lighting fixture in offices 1044, 1046, 1051, 1056, 1095 (10 fixtures) - lighting level is over 80 FC vs CSC technical criteria of 50 FC.

Proposed:

Réduce no of fixtures in each office/interview room to one centred in room over table or desk.

$\$2,000 - \$1,000 = \$1,000$

Advantages

Disadvantages

Lower cost.

Exterior walls of rooms not as bright.

Lower energy costs.

Lower lighting levels.

Savings

Capital Cost: \$1,000

Life Cycle Cost: --

Classification: AI



Person responsible for estimate: A. C. WRIGHT

Estimate Summary:

DELETE / REDUCE LTG FIXTURE IN EM'S
1044 / 1046 / 1051 / 1056 / 1095

DELETE 1 - 'A1' FIXTURE IN ALL EM'S
200 X 5 = 1000

Total Savings 2000 - 1000 = 1000

		Recommendation
PRESENT F.C. LEVELS.	1044 → 86 FC	50 FC
	1046 → 87 FC	30 FC
	1051 → 87 FC	30 FC
	1056 → 86 FC	50 FC
	1095 → 81 FC	50 FC

- Attach Hanscomb Summary Sheets E2, E3A & E4A with supporting details where appropriate.
- Establish cost models as required.
- Estimate or obtain operations and maintenance costs.

Data:

- 40 watt fluorescent \approx 3150 lumens.
- \therefore 1'x4' fixture \approx 6,300 lumens.
- \therefore 2'x4' fixture \approx 12,600 lumens.

$$F.C. = \frac{\text{lumens} \times \text{coef. of utilization (CU)} \times \text{LLD} \times \text{LPD}}{\text{area (sq. ft.)}}$$

$$= \frac{\text{lumens} \times 0.5 \times 0.87 \times 0.83}{\text{area}}$$

$$= \boxed{\frac{\text{lumens} \times 0.36}{\text{area (sq. ft.)}}}$$

— x —

For typical cell:

$$F.C. = \frac{6300 \times 0.6 \times 0.87 \times 0.83}{82}$$

Since small room.

$$= \underline{\underline{33}} \text{ or } \underline{\underline{38.8}}$$

35

say between 35 and 40 ft. candle.

PART II. RULES OF THUMB

.... The reflectance values and cavity ratios don't come out in even numbers that appear on the tables?

Estimate! Often intermediate values can be accurately determined by inspection, by examining the nearby values in the tables. In those cases where accuracy is important, however, face it, and go through a mathematical interpolation. Doing one or two makes it considerably easier.

.... Tables of coefficients of utilization aren't available for the specific fixture picked from a catalog?

Use the general tables shown in the IES Handbook or the following supplement pages.

.... No tables of any kind are available?

Just remember the basic equation: Footcandles = (Lumens/Area) X Coefficient of Utilization. A rough estimate can be obtained by assuming a CU and working back through the equation to find either footcandles or number of fixtures. Many interior spaces have CU's from 0.4 to 0.6. If the space is unusually small, has low reflectance surfaces or better than average shielding on the luminaires, estimate a lower CU value. If surfaces are light, areas large with few partitions, and efficient lenses or diffusers are used on the fixtures, estimate a higher CU value. Again, the answer will be rough, but it's better than a guess.

*used 0.5
generally.*

.... The reflectances of the surfaces are unknown?

Samples of materials together with their reflectances are available in the G.E. publication, Light & Interior Finishes (TP-129). Holding the sample next to the unknown surface provides a quick estimate. If a light meter is available, measure the light falling on the unknown surface, then turn the meter around, move it 3-4 inches from the surface and measure the light being reflected from the surface. The reflected light divided by the incident light times 100 is the approximate reflectance of the surface in per cent; or

$$\% \text{ Reflectance} = (\text{Reflected Light} / \text{Incident Light}) \times 100$$

.... Lamp catalogs are not available & the lumen output of various lamps is needed?

Again, a rough estimate can be obtained by memorizing general lamp efficacies (lumens per watt) and multiplying by the wattage of the lamp to be used. Just remember the following five numbers:

Incandescent	20 lumens per watt (50% less if PAR or R lamp)
Mercury	50 " " "
Fluorescent	80 " " "
Multi-Vapor	85 " " "
Lucalox	100 " " "

LAMP LUMEN DEPRECIATION FACTORS

GE Lamp Type		Watts	Mean Lumen Factor* (%)	LLD** (%)		
Incandescent	100A	100	93	90		
	150A	150	93	90		
	150PAR/SP and FL	150	84	78		
	150R/SP and FL	150	89	85		
	300M/IF	300	91	87		
	300R/SP and FL	300	94	92		
	500/IF	500	91	88		
	1000/IF	1000	92	89		
	1500/IF	1500	84	78		
Fluorescent	F40CW Mainlighter®	40	87	83		
	F40WW	40	87	83		
	F40CWX	40	83	73		
	F40WWX	40	83	73		
	F40CW/S Staybright®	40	90	86		
	F40WW/S	40	90	86		
	F96T12/CW	50	91	87		
	F96T12/WW	50	91	87		
	F96T12/CWX	50	87	78		
	F48T12/CW/HO	60	87	79		
	F96T12/CW/HO	110	87	77		
	F48PG17/CW	110	77	67		
	F96PG17/CW	215	75	65		
	F48T12/CW/1500	110	77	67		
F96T12/CW/1500	215	80	71			
High Intensity Discharge	Mercury †	H100DX38-4 (H38-4JA/DX)	100	76	69	
		H175DX39-22 (H39-22KC/DX)	175	81	76	
		H175WDX39-22 (H39-22KC/WDX)	175	77	71	
		H175RDXFL39-22 (H39-22BP/DX)	175	80	63	
		H250DX37-5 (H37-5KC/DX)	250	81	75	
		H250WDX37-5 (H37-5KC/WDX)	250	72	61	
		H400A33-1 (H33-1CD)	400	87	80	
		H400DX33-1 (H33-1GL/DX)	400	78	71	
		H400WDX33-1 (H33-1GL/WDX)	400	74	65	
		H1000A36-15 (H36-15GV)	1000	78	70	
		H1000DX36-15 (H36-15GW/DX)	1000	63	52	
		H1000WDX36-15 (H36-15GW/WDX)	1000	60	—	
		Multi-Vapor®	MV400/BU/I and BD/I	400	78	70
			MV1000/BU/I	1000	80	75
			MV400/BD and BUH	400	80	73
			MV1000/BD and BUH	1000	80	73
			MV1000/C/BD and BUH	1000	80	70
Lucalox®	LU150/BU and BD	150	90	85		
	LU250/BU and BD	250	91	88		
	LU400/BU and BD	400	90	84		
	LU1000/BU and BD	1000	92	90		

Use the Mean Lumen Factor when calculations involve average illumination between relampings (based upon lamp light output at 40-50% of rated life depending upon lamp type).

Use the LLD Factor when calculations involve minimum illumination between relampings (based upon lamp light output at approximately 70% of rated life).

Factors for mercury lamps are based upon 24,000 hours life.

Note: Factors shown for fluorescent lamps are based on 3 hours/start. Factors for Multi-Vapor and Lucalox lamps are based on 10 hours/start. All HID lamp factors are for vertical burning.

Lamp Comparisons

LAMP	WATTS	AVERG. LIFE	HORIZ. INITIAL LUMENS	HORIZ. MAINT. LUMENS	COLOR TEMP. IN DEGREES KELVIN	CRI	EFFICIENCY LUMEN/WATT
Daylight at noon					5000		
Incandescent							
General Electric							
Data	100	750	1750		2900	97	17.5
	300	750	6000		3000	97	20
Mercury—							
Deluxe White							
General Electric							
Data	100	24000	4000	3160	3900	46	40
	175	24000	8150	7010	3900	46	46.6
	250	24000	11500	9400	3900	46	46
	400	24000	21500	17200	3900	46	53.7
Mercury—							
Styletone							
Westinghouse							
	100	24000	3650	2700	3000	52	36.5
	175	24000	7000	5600	3000	52	40
	250	24000	11000	8250	3000	52	44
	400	24000	19500	15700	3000	52	48.7
Fluorescent							
✓ F40CW	40	20000	3150	2770	4200	66	78.7
F40CWX	40	20000	2200	1825	4200	89	55
F40WW	40	20000	3150	2770	3000	52	78.7
F40WWX	40	20000	2150	1785	2900	73	53.7
High Intensity Discharge							
MS175/HOR	175	7500	15000	12000	4500	65	85.7
MS175/C/HOR	175	7500	15000	12000	3800	70	85.7
MV250/U	250	10000	19500	14000	4250	65	78
MV250/C/U	250	10000	19500	13500	3900	70	78
MS400/HOR	400	15000	40000	32000	4500	65	100
MS400/C/HOR	400	15000	40000	31000	3800	70	100
MV400/U	400	10000	32000	25600	4000	65	80
MV400/C/U	400	10000	32000	24600	3700	70	80
LU 150	150	24000	16000	14400	2100	32	106
LU 250/S	250	24000	30000	27000	2100	32	120
LU 400	400	24000	50000	45000	2100	32	125
MS400/HOR - LU 250/S	650	19500	70000	59000	3000	65	107.7
MS400/HOR - LU 400	800	19500	90000	77000	2741	45	112.5
*MV400/U - LU 250/S	650	17000	62000	52600			95
*MV400/U - LU 310	710	17000	69000	59900			97.2
*MV 400/U - LU 400	800	17000	82000	70600			102.5

*More data may be provided upon request when available

FOUNTAINS OF LIGHT

McGraw-Hill
SPI Lighting

Area Lighting Division
McGraw-Hill Company
Racine, Wisconsin 53405

SPI LIGHTING



Subject: ELECTRICAL

VAP No.: E12

Date: _____

Item: TYPE 'A' LIGHTING FIXTURE - CONSTRUCTION

Revision: _____

Related Proposals	Baseline Value	Savings	
		Capital LCC	Energy O & M
	\$ 19,050		

Baseline:

Modified lighting fixture with special trim to retain 6.4 mm clear Lexan lens.

Proposed:

Mount Lexan lens separately under and separate from lighting fixture.

Advantages

Disadvantages

Lower cost.

More difficult to change lamps.

~~Savings~~

~~Capital Cost: \$6,000~~

~~Life Cycle Cost: --~~

~~Classification: A2~~



Person responsible for estimate: A.C. WEIGHT

Estimate Summary: DELETE

LIGHTING FIXTURE TYPE 'A'	108 X 150 =	16,200
'A1'	10 X 200 =	2,000
'A2'	5 X 170 =	850
		<u>19,050</u>

ADD (STANDARD FIXTURES)

A	108 X 70 =	7560
A1	10 X 90 =	900
A2	5 X 70 =	350
		8810
		+ 8810

ADD COST OF LEXAN

	108 X 32 =	3456
	10 X 64 =	640
	5 X 32 =	160
		4256
		+ 4256

COST OF REVISED ARRANGEMENT
 8810 + 4256 = 13,066

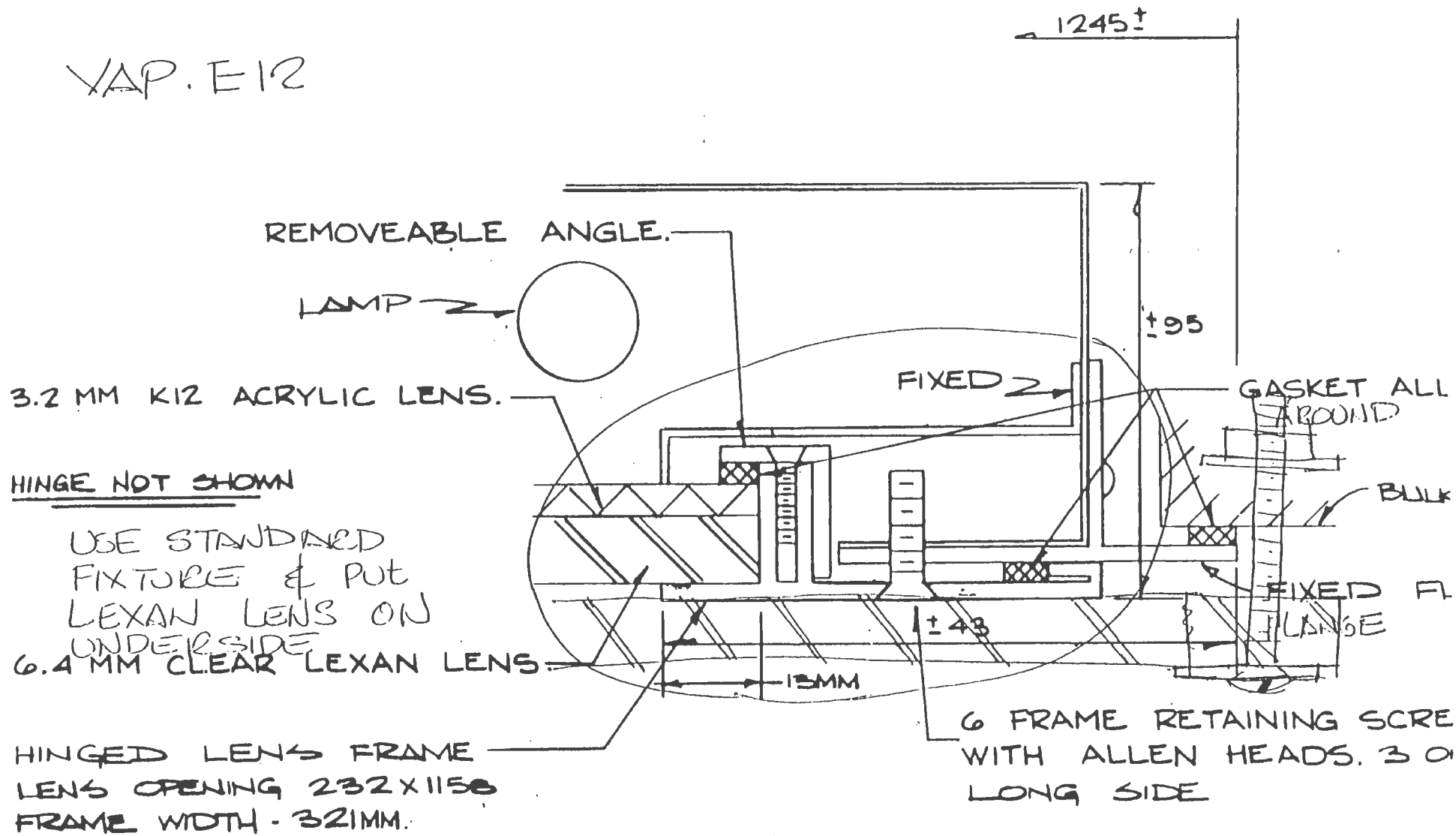
TOTAL SAVINGS 19,050 - 13,066 = ^{d/} 5984

Bay
D

^{d/} 6000

- Attach Hanscomb Summary Sheets E2, E3A & E4A with supporting details where appropriate.
- Establish cost models as required.
- Estimate or obtain operations and maintenance costs.

VAP. E12



2 LENS MOUNTING DETAIL - TYPE A FIXTURE
6.4 NTS



Subject: ELECTRICAL

VAP No.: E12A

Date: _____

Item: TYPE 'A' LIGHTING FIXTURE OUTSIDE OF CELLS

Revision: _____

Related Proposals	Baseline Value	Savings	
		Capital LCC	Energy O & M
	\$ 7,680		

Baseline:

A total of 64 fixtures recess mounted under balcony or above balcony.

Proposed:

Reduce total from 64 to 48 unit cost \$120 X 16 fixtures, saving:

$$\$120 \times 16 = \$1,920$$

Advantages

Lower (capital, energy & maintenance costs.

Based on 5000 hours per year

operation and 4¢/kwh -

\$640/year energy saving.

Disadvantages

Wider spacing 20' centres.

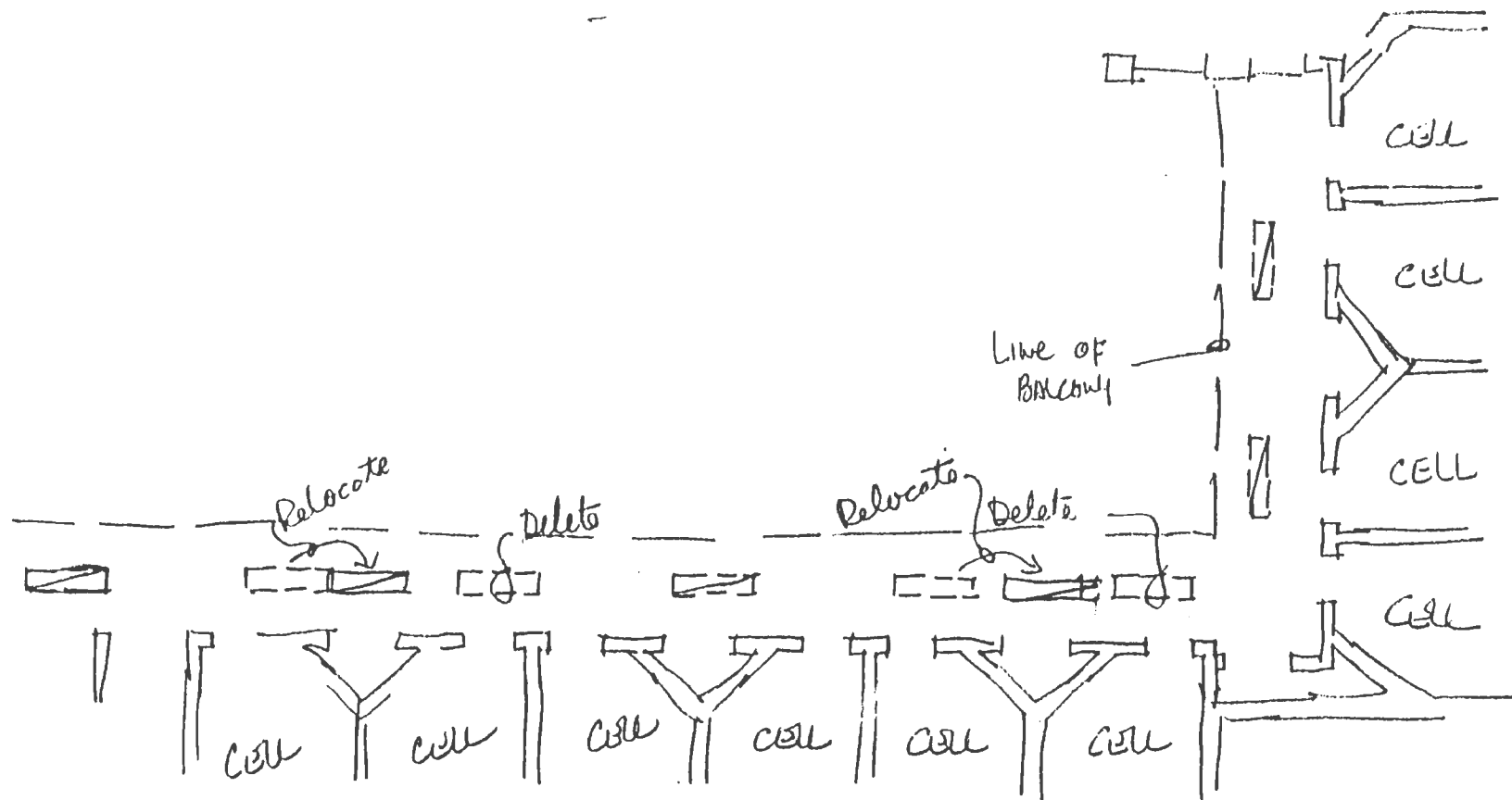
Savings

Capital Cost: \$ 1,920

Life Cycle Cost: \$14,528

Classification: AI

VAP # E12A



PART PLAN 2ND FLOOR

REDUCE TOTAL NO OF TYPE 'A'
FIXTURES FROM 8 TO 6

64 TO 48 (SAVINGS 16 FIXTURES)



Subject: ELECTRICAL

VAP No.: E13

Date: _____

Item: NUMBER OF TYPE 'L' FIXTURES

Revision: _____

Related Proposals	Baseline Value \$ 15,120	Savings	
		Capital LCC	Energy O & M

Baseline:

Dayrooms no 1, 2, 3 & 4 (1096, 1097, 1098 and 1099) are presently lit with 400 watt H.I.D. recessed and surface mounted lighting fixtures, with lighting levels of between 50 and 60 foot candles (30 fixtures).

Proposed:

Reduce no of fixture by 50% giving 25 - 30 FC. $15,120 \times \frac{1}{2} = 7,260$ saving.

Advantages

Disadvantages

Lower cost.
Energy savings of \$700/year
(8 hours per day).

Uneven lighting distribution (brighter and darker spots).

Savings

Capital Cost: \$ 7,260

Life Cycle Cost: \$16,100

Classification: A1

Area outside cells.

LLD = 13

$$\text{Length} = 15.0 \text{ m} = 49.2 \text{ ft.}$$

$$\text{width} = 6.6 \text{ m} = 21.6 \text{ ft.}$$

$$\text{Height of fixture} = 6.2 \text{ m} = 20 \text{ ft.}$$

$$\text{Room Cavity Ratio} = RCR = \frac{5h(L+W)}{L \times W} = \frac{5 \times 20 (49.2 + 21.6)}{49.2 \times 21.6}$$

$$= 6.66$$

say 7.0.

$$\text{Coef. of Utilization (CU)} = \begin{array}{l} \text{(from tables)} \\ \text{OR} \end{array} \begin{array}{l} 0.52 \text{ for } 80\% \text{ ceiling, } 70\% \text{ wall, } 20\% \text{ r.} \\ \underline{0.44} \text{ for } 80\% \text{ ceiling, } 50\% \text{ wall, } 20\% \text{ r.} \end{array}$$

$$\text{F.C.} = \frac{(\text{no. of fixtures}) \times (\text{lumens/fixt}) \times \text{LLD} \times \text{LDD} \times \text{CU}}{\text{Area}}$$

$$= \frac{6 \times 23000 \times 0.95 \times 0.9 \times 0.52}{49.2 \times 21.6} = \boxed{57.7}$$

OR

OR

$$= \boxed{48.8}$$

say between 50 and 60 foot candles

- Reduce HID lighting from 6 fixtures to 3 fixtures:

$$\therefore F.C = \frac{3 \times 23000 \times 0.95 \times 0.9 \times 0.52^{(0.49)}}{49.2 \times 21.6}$$

$$= 28.8 \quad \text{OR.} \quad 24.4.$$

Illumination level between 25 F.C. and 30 F.C.

Calculation of Minimum-Cost Illumination System for Specified Illumination Level

1. Desired average maintained minimum illumination level (FTC) = _____ horizontal footcandles.

2. Total rated lamp lumens (RLL): 23,000 lumens

MFGR.
CAT. NO.

RATED LAMP LUMENS** (Lamp manufacturer's data as of Sept. 1, 1971. Subject to Change.)								
SYLVANIA			GENERAL ELECTRIC			WESTINGHOUSE		
250 watt Color Improved	11,850		250 watt Color Improved	10,700		250 watt Color Improved	11,900	
250 watt Deluxe White	13,000		250 watt Deluxe White	12,100		250 watt Deluxe White	13,000	
400 watt Color Improved	20,500		400 watt Color Improved	20,500		400 watt Color Improved	20,500	
400 watt Deluxe White	23,000		400 watt Deluxe White	22,500		400 watt Deluxe White	23,000	
400 watt Metalarc	32,000		400 watt Multi-Vapor	34,000		400 watt Metal Halide	34,000	
400 watt Metalarc "C"	32,000		400 watt Lucalox	47,000		400 watt Ceramalux	47,000	
400 watt Lumalux 2	47,000		1000 watt Color Improved	55,000		1000 watt Color Improved	57,500	
1000 watt Color Improved	57,500		1000 watt Deluxe White	63,000		1000 watt Deluxe White	63,000	
1000 watt Deluxe White	63,000		1000 watt Multi-Vapor	91,500		1000 watt Metal Halide	90,000	
1000 watt Metalarc	100,000							

3. Determine Lamp Lumen Depreciation (LLD): 0.75

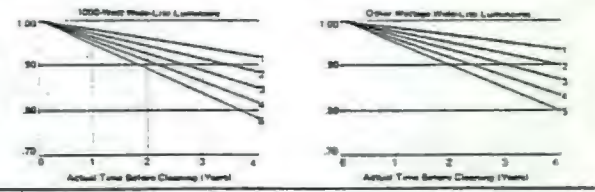
APPROXIMATE % OF RATED LUMENS** (Lamp manufacturer's data as of Sept. 1, 1971. Subject to change.)

Lamps	SYLVANIA								GENERAL ELECTRIC								WESTINGHOUSE											
	Burning hours of operation in thousands								Burning hours of operation in thousands								Burning hours of operation in thousands											
	2	4	6	8	10	12	16	20	24	2	4	6	8	10	12	16	20	24	2	4	6	8	10	12	16	20	24	
250 watt Color Improved	97	94	92	89	85	82	75	68	60	98	96	94	91	88	87	81	74	67	93	88	83	79	78	71	63	56	48	
250 watt Deluxe White	98	93	91	87	85	81	73	65	57	95	91	88	86	84	81	75	70	65	93	89	84	80	76	71	62	54	44	
400 watt Color Improved	98	95	93	90	87	85	80	75	70	98	94	91	89	86	84	78	70	62	92	88	85	82	80	78	72	68	62	
400 watt Deluxe White	97	94	91	87	84	82	76	74	64	93	91	87	84	81	78	71	67	60	90	87	84	80	78	74	68	61	56	
400 watt High Pressure Sodium*	97	95	93	90	86	82	—	—	—	98	96	93	90	86	83	—	—	—	97	95	93	90	87	—	—	—	—	—
400 watt Metal Halide*	86	78	73	68	67	—	—	—	—	86	78	71	65	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
400 watt Metal Halide (Phos)	82	70	62	59	55	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
1000 watt Color Improved	97	95	89	86	84	78	72	64	57	92	88	84	80	75	70	61	53	43	93	87	85	83	81	79	75	70	60	
1000 watt Deluxe White	91	88	82	77	74	71	64	57	50	91	85	79	75	69	63	52	41	30	86	78	71	66	61	56	49	40	32	
1000 watt Metal Halide*	87	78	73	—	—	—	—	—	—	86	78	70	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	

CAUTION: BALLAST CREST FACTOR HIGHER THAN 1.4 MAY ACCELERATE LAMP LUMEN DEPRECIATION.

4. Determine Luminaire Dirt Depreciation (LDD): _____

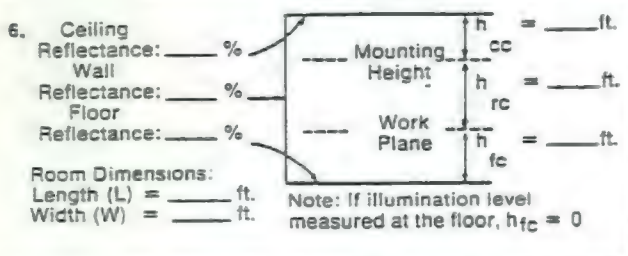
- Dirt Conditions
- 1 — Very Clean
 - 2 — Clean
 - 3 — Medium
 - 4 — Dirty
 - 5 — Very Dirty



5. Calculate Maintenance Factor (MF) = (LLD) x (LDD) = _____ x _____ = _____

10. Calculate Total Number of Luminaires (N)

$$N = \frac{\text{Total Room Area}}{(\text{APL})} = \frac{(L) \times (W)}{(\text{APL})}$$

$$= \frac{(\quad) \times (\quad)}{(\quad)} = \quad$$


11. Calculate approximate spacing (S) between adjacent luminaires

$$(S) = \sqrt{(\text{APL})} = \sqrt{\quad} = \quad$$

(See square root table on facing page.)

Note: The approximate number of luminaires across the length and width may be calculated from:

7. Calculate—or read from chart—the Room Cavity Ratio (RCR)

$$\text{RCR} = \frac{5h_{rc}(L + W)}{(L) \times (W)} = \quad$$

(Or see chart on p. 14)

Note: If (RCR) calculates less than 1.0, use 1.0.

Approximate number across length = $\frac{L}{S}$

Approximate number across width = $\frac{W}{S}$

8. Obtain Coefficient of Utilization (CU) from tables on pp. 9-13.

12. Finally: Using the ratios given in the shaded box in the same CU table used in step 8 above. MAKE SURE SPACING CALCULATED ABOVE DOES NOT EXCEED THE VALUES STATED FOR UNIFORM LIGHTING FOR THE SPECIFIED MOUNTING HEIGHT (h_{rc}). If the calculated (S) is too great, either reduce it or try another luminaire/lamp/reflector combination.

Some luminaires have greater maximum S/M.H. ratios in one plane than in the other and these should be oriented so that the greater maximum S/M.H. plane lies in the direction of the greater spacing distance to be used.

9. Calculate Area per Luminaire (APL)

$$(\text{APL}) = \frac{(\text{RLL}) \times (\text{MF}) \times (\text{CU})}{(\text{FTC})}$$

$$= \frac{(\quad) \times (\quad) \times (\quad)}{(\quad)} = \quad \text{sq. ft.}$$

ID-400-A,C,&F
H33-1GL/DX
Floor Reflectance: 20%

Luminaire Distribution Data

System Code	Reflector	Lens	Maximum S/MH Ratio
A	Soecular	Clear	1.2
C	Diffuse	Clear	1.3
F	Specular	Flax	1.2

Mid-zone Angle	Candlepower at 10 Feet		
	A	C	F
0°	7.946	7.050	8.360
5°	7.961	7.093	8.290
15°	7.332	6.993	7.720
25°	6.545	6.537	6.900
35°	5.711	5.667	5.390
45°	4.374	4.139	3.300
55°	2.250	2.141	1.527
65°	.739	.642	.614
75°	.189	.157	.263
85°	.32	.42	.63



Ceiling Reflectance		80%			70%			50%			30%			10%			0%		
% Wall Reflectance	70%	50%	30%	10%	70%	50%	30%	10%	50%	30%	10%	50%	30%	10%	50%	30%	10%	0%	
A	1.	.77	.75	.73	.71	.75	.73	.71	.70	.70	.69	.67	.68	.67	.65	.64	.64	.64	.62
C		.74	.72	.70	.68	.73	.70	.69	.67	.68	.66	.65	.64	.63	.62	.61	.61	.61	.60
F		.70	.68	.66	.64	.69	.67	.65	.63	.64	.63	.61	.62	.61	.60	.60	.59	.58	.57
A	2.	.72	.68	.65	.62	.71	.67	.64	.62	.65	.62	.60	.63	.61	.59	.61	.59	.58	.56
C		.70	.66	.63	.60	.68	.65	.62	.60	.62	.60	.58	.60	.59	.57	.59	.57	.56	.54
F		.66	.62	.59	.56	.64	.61	.58	.56	.59	.56	.54	.57	.55	.53	.55	.53	.52	.51
A	3.	.68	.63	.59	.56	.67	.62	.58	.55	.60	.57	.54	.58	.56	.53	.57	.54	.52	.51
C		.65	.60	.57	.53	.64	.60	.56	.53	.58	.55	.52	.56	.54	.51	.55	.52	.51	.50
F		.62	.57	.53	.50	.60	.56	.52	.49	.54	.51	.48	.52	.50	.48	.51	.49	.47	.46
A	4.	.63	.57	.53	.49	.62	.56	.52	.49	.55	.51	.48	.53	.50	.48	.52	.49	.47	.46
C		.61	.55	.51	.48	.60	.54	.50	.47	.53	.50	.47	.52	.48	.46	.50	.48	.45	.44
F		.57	.52	.47	.44	.56	.51	.47	.44	.49	.46	.43	.48	.45	.43	.47	.44	.42	.41
A	5.	.59	.52	.48	.44	.58	.52	.47	.44	.50	.46	.43	.49	.46	.43	.48	.45	.42	.41
C		.57	.51	.46	.42	.56	.50	.46	.42	.49	.45	.42	.47	.44	.41	.46	.43	.41	.40
F		.53	.47	.42	.39	.52	.46	.42	.39	.45	.41	.38	.44	.41	.38	.43	.40	.38	.37
A	6.	.55	.48	.43	.39	.54	.47	.43	.39	.46	.42	.39	.45	.42	.39	.44	.41	.38	.37
C		.53	.46	.42	.38	.52	.46	.41	.38	.45	.41	.38	.44	.40	.38	.43	.40	.37	.36
F		.50	.43	.38	.35	.49	.42	.38	.35	.41	.37	.35	.40	.37	.34	.39	.36	.34	.33
A	7.	.52	.44	.39	.35	.50	.43	.39	.35	.42	.38	.35	.41	.38	.35	.41	.37	.35	.33
C		.50	.42	.37	.34	.49	.42	.37	.34	.41	.37	.34	.40	.36	.34	.39	.36	.33	.32
F		.46	.39	.35	.31	.45	.39	.34	.31	.38	.34	.31	.37	.33	.31	.36	.33	.31	.30
A	8.	.48	.40	.35	.32	.47	.40	.35	.31	.39	.34	.31	.38	.34	.31	.37	.34	.31	.30
C		.46	.39	.34	.31	.45	.38	.34	.30	.37	.33	.30	.37	.33	.30	.36	.33	.30	.29
F		.43	.36	.31	.28	.42	.35	.31	.28	.34	.30	.28	.34	.30	.27	.33	.30	.27	.26
A	9.	.45	.37	.32	.28	.44	.36	.31	.28	.35	.31	.28	.35	.31	.28	.34	.31	.28	.27
C		.43	.35	.31	.27	.42	.35	.30	.27	.34	.30	.27	.34	.30	.27	.33	.29	.27	.26
F		.40	.32	.28	.25	.39	.32	.28	.24	.31	.27	.24	.31	.27	.24	.30	.27	.24	.23
A	10.	.40	.32	.27	.24	.40	.32	.27	.24	.31	.27	.24	.31	.27	.24	.30	.26	.23	.22
C		.39	.31	.26	.23	.39	.31	.26	.23	.30	.26	.23	.29	.25	.23	.29	.25	.23	.22
F	RCR	.37	.30	.25	.22	.36	.29	.25	.22	.29	.25	.22	.28	.24	.22	.28	.24	.22	.21

ID-400-C & F
METAL HALIDE
Floor Reflectance: 20%

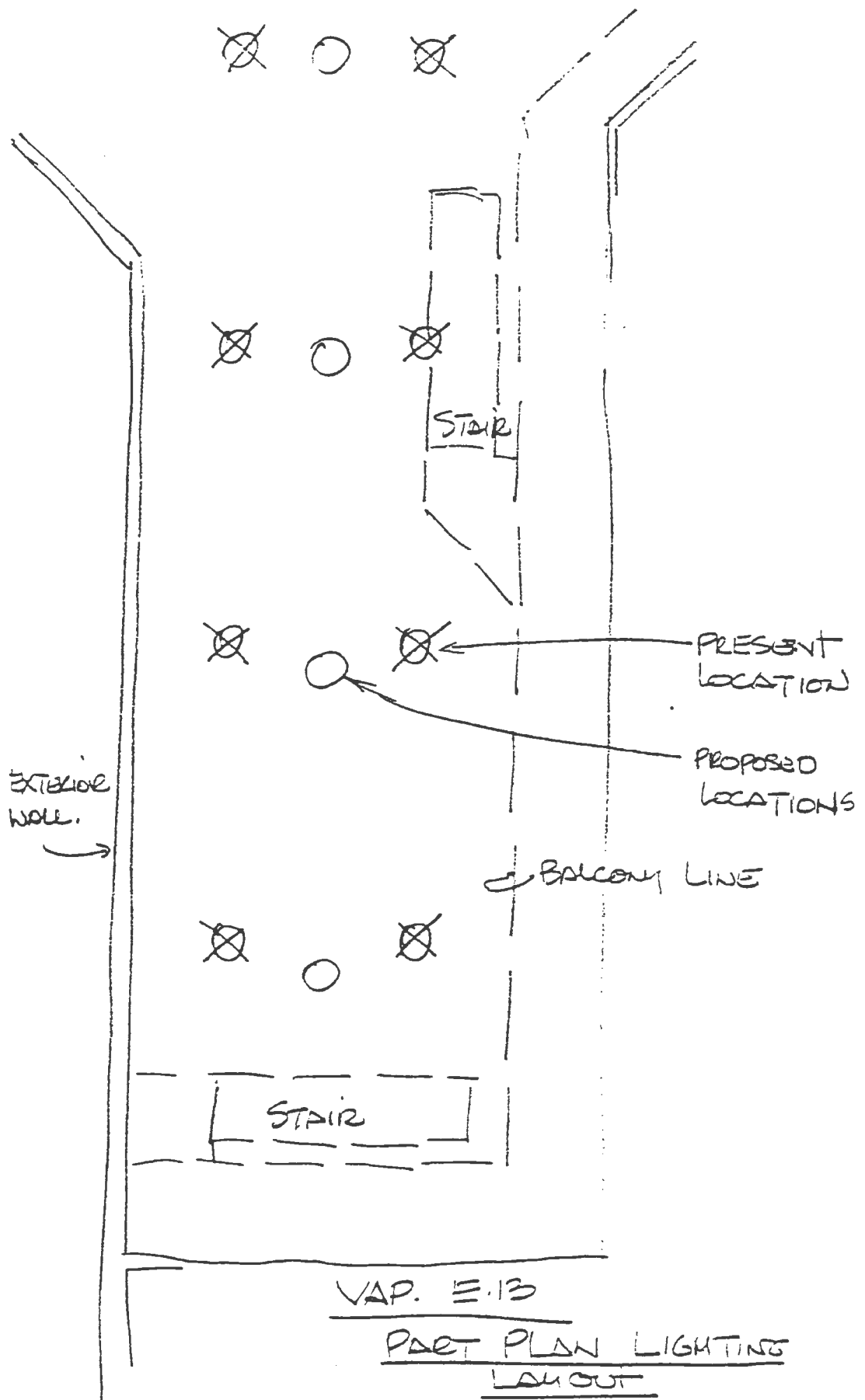
Luminaire Distribution Data

System Code	Reflector	Lens	Maximum S/MH Ratio
C	Diffuse	Clear	1.5
F	Specular	Flax	1.2

Mid-zone Angle	Candlepower at 10 Feet	
	C	F
0°	8,122	11,783
5°	8,538	11,634
15°	10,387	11,390
25°	9,639	10,391
35°	8,870	8,628
45°	6,813	5,344
55°	3,905	2,433
65°	.457	.946
75°	.187	.401
85°	.63	.106



Ceiling Reflectance		80%			70%			50%			30%			10%			0%		
% Wall Reflectance	70%	50%	30%	10%	70%	50%	30%	10%	50%	30%	10%	50%	30%	10%	50%	30%	10%	0%	
C	1.	.77	.75	.73	.71	.76	.72	.71	.69	.70	.69	.67	.67	.66	.65	.65	.64	.63	.62
F		.74	.71	.69	.67	.72	.70	.68	.66	.67	.66	.64	.65	.63	.62	.61	.61	.61	.59
C	2.	.72	.68	.65	.62	.71	.68	.64	.62	.65	.62	.60	.62	.61	.59	.61	.59	.58	.56
F		.69	.65	.62	.59	.67	.64	.61	.58	.61	.59	.57	.59	.57	.56	.58	.56	.54	.53
C	3.	.68	.63	.59	.55	.66	.62	.58	.55	.60	.57	.54	.58	.55	.53	.57	.54	.52	.51
F		.64	.59	.55	.52	.63	.58	.54	.51	.56	.53	.50	.55	.52	.50	.53	.51	.49	.48
C	4.	.63	.57	.53	.49	.62	.56	.52	.49	.55	.51	.48	.53	.50	.48	.52	.50	.47	.46
F		.60	.54	.49	.46	.59	.53	.49	.45	.51	.48	.45	.50	.47	.44	.49	.46	.44	.43
C	5.	.59	.52	.47	.44	.58	.51	.47	.43	.50	.46	.43	.49	.45	.43	.48	.45	.42	.41
F		.56	.49	.44	.40	.54	.48	.44	.40	.47	.43	.40	.46	.42	.39	.44	.41	.39	.38
C	6.	.55	.47	.43	.39	.54	.47	.42	.39	.46	.42	.39	.45	.41	.38	.44	.40	.38	.37
F		.52	.45	.40	.36	.51	.44	.39	.36	.43	.39	.36	.42	.38	.35	.41	.38	.35	.34
C	7.	.51	.43	.38	.35	.50	.43	.38	.34	.42	.37	.34	.41	.37	.34	.40	.36	.34	.33
F		.48	.41	.36	.32	.47	.40	.35	.32	.39	.35	.32	.38	.34	.32	.37	.34	.31	.30
C	8.	.47	.39	.34	.31	.46	.39	.34	.31	.38	.33	.30	.37	.33	.30	.36	.33	.30	.29
F		.45	.37	.32	.28	.44	.36	.32	.28	.36	.31	.28	.35	.31	.28	.34	.31	.28	.27
C	9.	.44	.36	.31	.27	.43	.35	.30	.27	.35	.30	.27	.34	.30	.27	.33	.29	.27	.26
F		.41	.33	.28	.25	.40	.33	.28	.25	.32	.28	.25	.32	.28	.25	.31	.27	.25	.24
C	10.	.39	.31	.26	.23	.39	.31	.26	.23	.30	.26	.23	.29	.25	.23	.29	.25	.23	.22
F		.38	.30	.26	.22	.38	.30	.25	.22	.29	.25	.22	.28	.25	.22	.28	.25	.23	.22
	RCR																		



EXTERNAL WALL.
→

PRESENT LOCATION

PROPOSED LOCATION

BALCONY LINE

STAIR

STAIR

VAP. E.13

PART PLAN LIGHTING LAYOUT

NOT TO SCALE



Subject: ELECTRICAL

VAP No.: E14

Date: _____

Item: WATTAGE OF TYPE 'L' FIXTURES

Revision: _____

Related Proposals	Baseline Value \$ 15,120	Savings	
		Capital LCC	Energy O & M

Baseline:

Dayrooms no 1, 2, 3 & 4 (1096, 1097, 1098 and 1099) are presently lit with 400 watt H.I. D. recessed and surface mounted lighting fixtures, with lighting levels of between 50 and 60 foot candles (30 fixtures).

Proposed:

Reduce wattage to 250 watts, based on:

1. 30 fixtures;
2. If VAP E13 accepted, 15 fixtures.

Advantages

\$525/year energy savings
based on 8 hours per day
operation (1).

Disadvantages

Lower lighting level.
Approximately 20 FC.

\$262/year energy savings
based on 8 hours per day
operation (2).

Savings

Alternatives

	1	2
Capital Cost:	\$ 1,200	600
Life Cycle Cost:	\$12,075	6,038
Classification:	A2	A3

VAP. 314.	QUANTITY	RATE	S
<p>A) PRICE OF 250 WATT FIXTURE VS 400 WATT. $40 \times 30 = 1200$</p>		SAVINGS \$	\$10./ fixture
<p>ENERGY SAVINGS $150 \text{ WATTS} \times 30 = 4500 \text{ W.} \times 8 \text{ HR/DAY}$ $4.5 \times 8 \times 365 \times .04 = 525.60$ <small>KW HRS DAYS ELECT COST.</small></p>			
<p>B) 50% OF Δ 1/2 NO OF FIXTURES $1200 \div 2 = 600.$</p>			



Subject: ELECTRICAL

VAP No.: E15

Item: HID FIXTURES

Date: _____

Revision: _____

Related Proposals	Baseline Value \$ 15,120	Savings	
		Capital	Energy
		LCC	O & M

Baseline:

Dayrooms no 1, 2, 3 & 4 (1096, 1097, 1098 & 1099) are presently lit with 400 watt HID recessed & surface mounted lighting fixtures, with lighting levels of between 50 and 60 foot candles.

Proposed:

1. Change to high pressure sodium at 250 watt, 30 no fixtures.
2. If VAP E13 accepted, 15 no fixtures.

Advantages

Less energy use per fixture.

Disadvantages

Colour.

Based on 8 hours per day operation:

1. \$525/year saving.
2. \$262/year saving.

Savings

Alternatives

	1	2
Capital Cost:	\$ 1,200	600
Life Cycle Cost:	\$12,075	6,038
Classification:	A2	A3

Person responsible for estimate: A. C. WRIGHT

Estimate Summary:

A) Cost of H.I.D. TYPE 'L' FIXTURES	\$ 500 (INSTALLED)
Cost of H.P.S " 'L' " "	\$ 540 (INSTALLED)

30 X \$50 =	15000	
30 X \$40 =	16200	ADDITIONAL COST 1200

ENERGY COST 150 WATTS X 30 = 4.5 KW,
 ANNUAL ENERGY COST $4.5 \times 8 \times 365 \times .04 = | 525 |$

B/ ADDITIONAL COST 50% OF FIXTURES | 600 |
 ANNUAL ENERGY COST | \$ 262 |

- Attach Hanscomb Summary Sheets E2, E3A & E4A with supporting details where appropriate.
- Establish cost models as required.
- Estimate or obtain operations and maintenance costs.



Subject: ELECTRICAL

VAP No.: E16

Date: _____

Item: LIGHTING & POWER CONDUIT RACEWAYS

Revision: _____

Related Proposals	Baseline Value \$ 25,000	Savings	
		Capital LCC	Energy O & M

Baseline:

Specification presently calls for E.M.T. for lighting and power conduit raceways.

Proposed:

Where conduit is not exposed use P.V.C. rigid conduit in concrete slabs or walls.

Advantages

Faster installation.

Disadvantages

Separate ground wire to be run, in all conduit.

Savings

Capital Cost: \$7,500

Life Cycle Cost: --

Classification: A2

VAP #16	QUANTITY	RATE	\$
TOTAL COST OF ALL EMT LIGHTING & POWER \$125,000			
BURIED IN SLAB'S / WALLS ETC 60%			
$125,000 \times .6 = 75,000$			
P.V.C. INSTALL IN SLAB + EXTRA GROUND			
50% OF COST OF EMT,			
$75,000 \times .5 = 37,500$			



Subject: ELECTRICAL

VAP No.: E17

Item: NOT ALLOCATED

Date: _____

Revision: _____

Related Proposals	Baseline Value \$	Savings	
		Capital LCC	Energy O & M

Baseline:

Proposed:

Not allocated.

Advantages

Nil

Disadvantages

Nil

~~Savings~~

~~Capital Cost: --~~

~~Life Cycle Cost: --~~

~~Classification: --~~



Subject: ELECTRICAL

VAP No.: E18

Item: C.C.T.V. EMPTY CONDUIT SYSTEM

Date: _____

Revision: _____

Related Proposals	Baseline Value	Savings	
		Capital LCC	Energy O & M
	\$ 1,245		

Baseline:

3/4" empty conduit to boxes on exterior walls for future T.V. system.

Proposed:

Detele system - not likely to be used at this location.

Advantages

Nil

Disadvantages

Nil

Savings

Capital Cost: \$1,245

Life Cycle Cost: --

Classification: A2



Person responsible for estimate: D.C. WRIGHT

Estimate Summary:

DELETE C.C.T.V. EMPTY CONDUIT SYSTEM.

BASE LINE VALUE \$1245

(EMPTY CONDUIT SYSTEM ONLY 3/4" DIA.)

SAVINGS \$1245. CAPITAL COST.

- Attach Hanscomb Summary Sheets E2, E3A & E4A with supporting details where appropriate.
- Establish cost models as required.
- Estimate or obtain operations and maintenance costs.



Subject: ELECTRICAL

VAP No.: E19

Item: CLOCKS

Date: _____

Revision: _____

Related Proposals	Baseline Value	Savings	
		Capital LCC	Energy O & M
	\$ 1,500		

Baseline:

6 clock outlets.

Proposed:

Only 1 clock outlet, cost of clock outlet central guard control station \$500.

Advantages

Lower cost.

Disadvantages

Clocks not visable from all cells.

~~Savings~~

~~Capital Cost: \$1,000~~

~~Life Cycle Cost:~~

~~Classification: A2~~



Oct 3/93

Person responsible for estimate: D.C. WRIGHT,

Estimate Summary:

BASELINE SYSTEM: \$1500 (TOTAL)

DELETE TOTAL SYSTEM CONDUIT, WIRE &
BOXES EXCEPT GUARD STATION CLOCK.

1500 - 500 = 1000 SAVINGS

- Attach Hanscomb Summary Sheets E2, E3A & E4A with supporting details where appropriate.
- Establish cost models as required.
- Estimate or obtain operations and maintenance costs.



Subject: ELECTRICAL

VAP No.: E20

Item: SPEAKERS

Date: _____

Revision: _____

Related Proposals	Baseline Value	Savings	
		Capital LCC	Energy O & M
	\$ 6,100		

Baseline:

P.A. system has speakers above cell doors on both ground floor and 2nd floor.

Proposed:

Delete total of 40 speakers at these locations - speaker boxes and conduit only.

Advantages

Disadvantages

Lower cost.

Nil

Less opening in fibreglass,
bulkhead panels.

Savings

Capital Cost: \$2,750

Life Cycle Cost: _____

Classification: A1



OCT 3/85

Person responsible for estimate: A. C. WRIGHT.

Estimate Summary: DELETE SPEAKERS IN FRONT OF
CELLS ON LEVELS & WINGS

19mm EMT 21 x 2 = 84m x 6.50 = 546.

25mm EMT 25 x 1 25m x 8.50 = 212.

PICK UP EXTERIOR HORNS FROM CENTRE AREA
SPEAKERS. 5 x 3 = 40 x 50 = 2000

WIRE COST. NOT INCLUDED EMPTY CONDUIT

TOTAL SAVINGS 546 + 212 + 2000 = 2758

say \$2750.

* ADDITION SAVINGS OF SPEAKERS NOT
IN THIS CONTRACT.

- Attach Hanscomb Summary Sheets E2, E3A & E4A with supporting details where appropriate.
- Establish cost models as required.
- Estimate or obtain operations and maintenance costs.



Subject: ELECTRICAL

VAP No.: E21

Item: LIGHTING PROTECTION

Date: _____

Revision: _____

Related Proposals	Baseline Value \$ 17,000	Savings	
		Capital LCC	Energy O & M

Baseline:
Complete lighting protection system around roof and connected to all metal equipment.

Proposed:
Delete complete system except grounding to electrical service total system \$17,000 - grounding \$2,000 - net saving \$15,000. Lighting risk assessment value over 4 (4.17) and requires protection per code.

Advantages	Disadvantages
Nil	Less protection against lighting strikes and damage by same.
	Validate NFPA 78-1980 risk assessment calculations.

Analysis:

- Risk assessment calculations to be validated - check NFPA 78-1980.
- It should be determined if this building is in same classification as hospitals and handicapped homes.

Savings

Capital Cost: \$15,000

Life Cycle Cost: _____

Classification: A2



Person responsible for estimate: A.C. WRIGHT

Estimate Summary: DELETE LIGHTNING PROTECTION

RISK ASSESSMENT

$$\frac{A + B + C + D + E}{F}$$

$$\frac{10 + 3 + 5 + 1 + 6}{7} = 4.16$$

AS FIGURES A,B,C,D,E ARE ROUNDED

ROUND ANSWER

Score (4)

MAKE DRAW & CONSIDER FOR LIGHTNING PROTECTION

- CONSIDER ① HIGHER METAL STRUCTURES CAN PROTECTED ON SITE
E.G. WATER TOWER, RECREATION CENTRES ETC.

② NO OTHER BUILDINGS ON SITE PROTECTED

3. How NEPA 78-197, Paragraph 4.1 should be applied in this case? What are the consequences?

- Attach Hanscomb Summary Sheets E2, E3A & E4A with supporting details where appropriate.
- Establish cost models as required.
- Estimate or obtain operations and maintenance costs.

development of a hazardous condition and provide a warning prior to the first discharge.

H-1.7 Cables connected to parked aircraft should not be handled when a thunderstorm is in the vicinity. The use of hand signals, without the use of headsets, is recommended for ground-to-cockpit communications during this period.

Case Technical Guidelines states "Places to be accessed at hospitals."

Appendix I Risk Assessment Guide

This Appendix is not a part of the requirements of this NFPA document . . . but is included for information purposes only.

I-1 General.

I-1.1 This lightning risk assessment guide is prepared to assist in the analysis of various criteria to determine the risk of loss due to lightning. As a guide, it is not possible to cover each special design element that may render a structure more or less susceptible to lightning damage. In special cases personal and economic factors may be very important and should be considered in addition to the assessment obtained by use of this guide.

I-1.2 If the structure is in a high risk situation, a risk index (R) should be computed for a wide range of structures in the environment concerned. The structure's index is then compared to the index of these other structures so that a judgment of local risk weighting can be made.

I-2 Determining the Risk. The assessment of risk index (R) is given in Table I-2. The risk index (R) is obtained by dividing the sum of the values given in Tables I-2a through I-2e by the lightning frequency index value obtained from Table I-2f.

The risk index (R) is:

$$R = \frac{A + B + C + D + E}{F}$$

Table I-2
Assessment of Risk, R

R Value	Risk Value
0-2	Light
2-3	Light to Moderate
3-4	Moderate
4-7	Moderate to Severe
Over 7	Severe

Area = 15,000 sq ft

Table I-2a

Index Structure	Index "A" - Type of Structure	Value
Single family residence less than 5,000 sq ft (465 m ²)		1
Single family residence over 5,000 sq ft (465 m ²)		2
Residential, office or factory building less than 50 ft (15 m) in height:		
Covering less than 25,000 sq ft (2323 m ²) of ground area		3
Covering over 25,000 sq ft (2323 m ²) of ground area		5
Residential, office or factory building from 50 to 75 ft (15 to 23 m) high		4
Residential, office or factory building from 75 to 150 ft (23 to 46 m) high		5
Residential, office or factory building from 150 ft (46 m) or higher		8
Municipal services buildings, fire, police, water, sewer, etc.		7
Hangars		7
Power generating stations, central telephone exchanges		8
Water towers and cooling towers		8
Libraries, museums, historical structures		8
Farm buildings		9
Golf shelters and other recreational shelters		9
Places of public assembly such as schools, churches, theaters, stadiums		9
Slender structures such as smokestacks, church steeples and spires, control towers, lighthouses, etc.		10
Hospitals, nursing homes, housing for the elderly or handicapped		10
Buildings housing the manufacture, handling or storage of hazardous materials		10

Table I-2b

Index "B" - Type of Construction

Structural Framework	Roof Type	Index Value
Nonmetallic (Other than wood)	Wood	5
	Composition	3
	Metal - not continuous	4
	Metal - electrically continuous	1
Wood	Wood	5
	Composition	3
	Metal - not continuous	4
	Metal - electrically continuous	2
Reinforced Concrete	Wood	5
	Composition	3
	Metal - not continuous	4
	Metal - electrically continuous	1
Structural Steel	Wood	4
	Composition	3
	Metal - not continuous	3
	Metal - electrically continuous	1

NOTE: Composition roofs include asphalt, tar, tile, slate, etc.

Table I-2c

Index "C" - Relative Location

Location	Index Value
Structures in areas of higher structures:	
Small structures - covering ground area of less than 10,000 sq ft (929 m ²)	1
Large structures - covering ground area of more than 10,000 sq ft (929 m ²)	2
Structures in areas of lower structures:	
Small structures - covering ground area of less than 10,000 sq ft (929 m ²)	4
Large structures - covering ground area of more than 10,000 sq ft (929 m ²)	5
Structures extending up to 50 ft (15.2 m) above adjacent structures or terrain	7
Structures extending more than 50 ft (15.2 m) above adjacent structures or terrain	10

Table I-2d
Index "D" — Topography

Location	Index Value
On flat land	1
On hillside	2
On hill top	4
On mountain top	5

Table I-2e
Index "E" — Occupancy and Contents

Noncombustible materials — unoccupied	1
Residential furnishings	2
Ordinary furnishings or equipment	2
Cattle and livestock	3
Small assembly of people — less than 50	4
Combustible materials	5
Large assembly of people — 50 or more	6
High value materials or equipment	7
Essential services — police, fire, etc.	8
Immobile or bedfast persons	8
Flammable liquids or gases — gasoline, hydrogen, etc.	8
Critical operating equipment	9
Historic contents	10
Explosives and explosive ingredients	10

Table I-2f
Index "F" — Lightning Frequency

Isoceraunic Level
(See isoceraunic map.)

0-5	9
6-10	8
11-20	7
21-30	6
31-40	5
41-50	4
51-60	3
61-70	2
Over 70	1

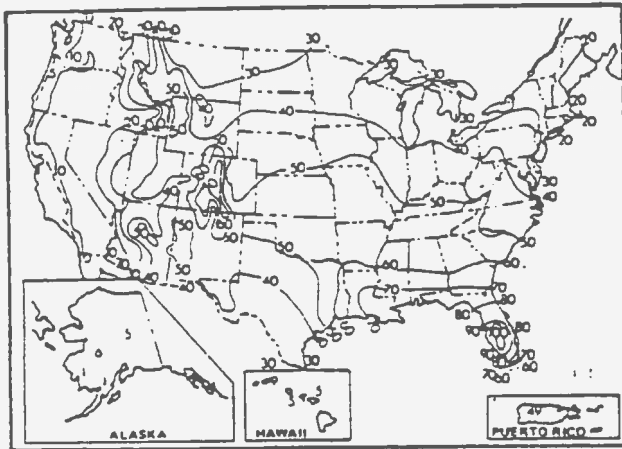


Figure I-2f(a). Statistics for Continental United States showing mean annual number of days with thunderstorms. The highest frequency is encountered in south-central Florida. Since 1894, the recording of thunderstorms has been defined as the local calendar day during which thunder was heard. A day with thunderstorms is so recorded regardless of the number occurring on that day. The occurrence of lightning without thunder is not recorded as a thunderstorm. (Data supplied by Environmental Science Service Administration, US Department of Commerce.)

The computed "R" values for the eastern United States should be multiplied by a factor varying from 1.5 in the Northeast to 0.5 in the Southeast. This factor is due to the differences in storm characteristics in these regions.

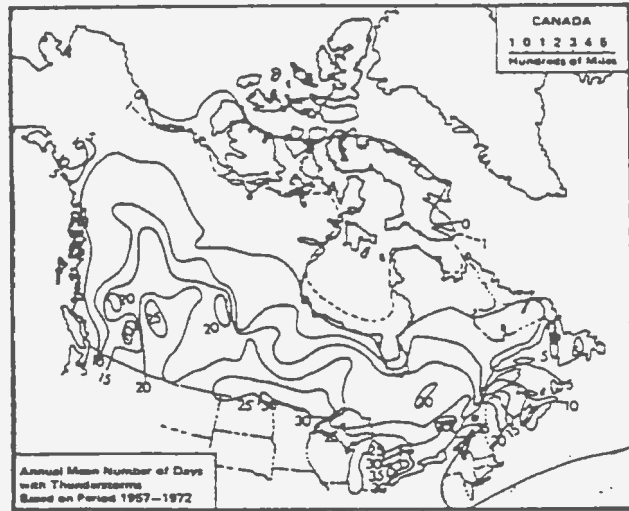


Figure I-2f(b). Canadian statistics showing annual average of days with thunderstorms. Data based on the period 1957-1972. (Meteorological Division, Department of Transportation, Canada.)

Between 20 and 25

Appendix J Ground Measurement Techniques

This Appendix is not a part of the requirements of this NFPA document . . . but is included for information purposes only.

In order to determine the ground resistance of a lightning protection system, it is necessary to remove it from any other ground connection. This may prove a virtually impossible task necessitating making certain assumptions. In reality, ground resistance measuring equipment works at low frequencies relative to the lightning discharge. The resistance it computes is therefore often affected by the resistance of power system ground electrodes or a similar ground medium which may be several thousand feet from the structure being protected. The ground resistance to be used to calculate lightning conductor potentials when a high frequency lightning discharge strikes a building must be the grounds in the immediate area of the building, and not the remote ones that ground measuring equipment probably monitors.

If the building is small, and the lightning protection system can be disconnected totally from any other grounding network, its resistance can be measured by the three-point technique described below. If the building is large or cannot be disconnected totally from any other grounding network, then the ground resistance of individual isolated lightning protection ground rods should be measured by the three-point technique described below, and this resistance multiplied by a factor depending on the number of ground rods.



Subject: ELECTRICAL

VAP No.: E22

Date: _____

Item: E.M.T. CONDUIT IN SLAB

Revision: _____

Related Proposals	Baseline Value \$ 33,800	Savings	
		Capital LCC	Energy O & M

Baseline:

Specification presently calls E.M.T. for all systems conduit raceways.

Proposed:

Where conduit is not exposed use P.V.C. rigid conduit in concrete slabs or walls.

Advantages

Disadvantages

Faster installation.

Nil

Savings

Capital Cost: \$10,140

Life Cycle Cost:

Classification: A2

VAP ERL	QUANTITY	RATE	\$
USE RIGID P.V.C. IN SLAB FOLLOWING SYSTEMS			
① TELEPHONE	ENT COST 1430		
② E.C.T.V.	2420		
③ CLOCK SYSTEM	650		
④ PAGING & INTERCOM.	5500		
5 CALL CALL / DOOR LOCK SYSTEMS	23,825		
	<u>\$ 33,825</u>		
TOTAL 33,800 60% OF CONDUIT TO BE CONCEALED IN SLABS ETC. = \$ 20,280			
COST OF P.V.C. INSTALLED 50% OF ENT. \$ = <u>10,140</u>			



Subject: ELECTRICAL

VAP No.: E23

Date: _____

Item: CONDUIT FOR VARIOUS SYSTEMS

Revision: _____

Related Proposals	Baseline Value \$ 61,345	Savings	
		Capital LCC	Energy O & M

Baseline:

Separate conduits are provided for the following systems:

- a) cell call (\$14,825) b) ECTVC (\$8,037) low voltage with wiring included (\$15,000) lock with wiring included (\$23,150).

Proposed:

Combine cell call and ECTVC (wiring by others) and low voltage (lighting) and door lock.

Advantages

Lower cost.

Disadvantages

Possibly less provision for future requirements.

Analysis:

Based on discussions with JSI Systems, the potential cost reduction was established at \$15,000 (25%) with PVC home runs.

Savings

Capital Cost: \$15,000

Life Cycle Cost: _____

Classification: B2



Subject: ELECTRICAL

VAP No.: E24

Item: ELECTRICAL DUCT ROUTING (SITE)

Date: _____

Revision: _____

Related Proposals	Baseline Value \$ 37,375	Savings	
		Capital	Energy
		LCC	O & M

Baseline:

Drawing show ducts for cable T.V. and telephone routing around North side of building and new ducts and manhole (#9) to reroute existing duct where building conflicts with duct.

Proposed:

Run duct in from manhole (#6) to South/West entrance and under building to riser and equipment location.

Advantages

Shorter runs.
Less manholes.

Disadvantages

Runs under building.
Bends in duct.

Savings

Capital Cost: \$26,375

Life Cycle Cost:

Classification: A1



Person responsible for estimate: D. C WRIGHT

Estimate Summary:

REROUTE ELECTRICAL DUCTS.

DELETE 4-4" - 107m @ 140/m = 14975

10-4" 47M @ 285/m = 13400

MANHOLES #10, 9, & 7 = :: ::

3 @ 3000 = 9,000

(\$ 37,375)

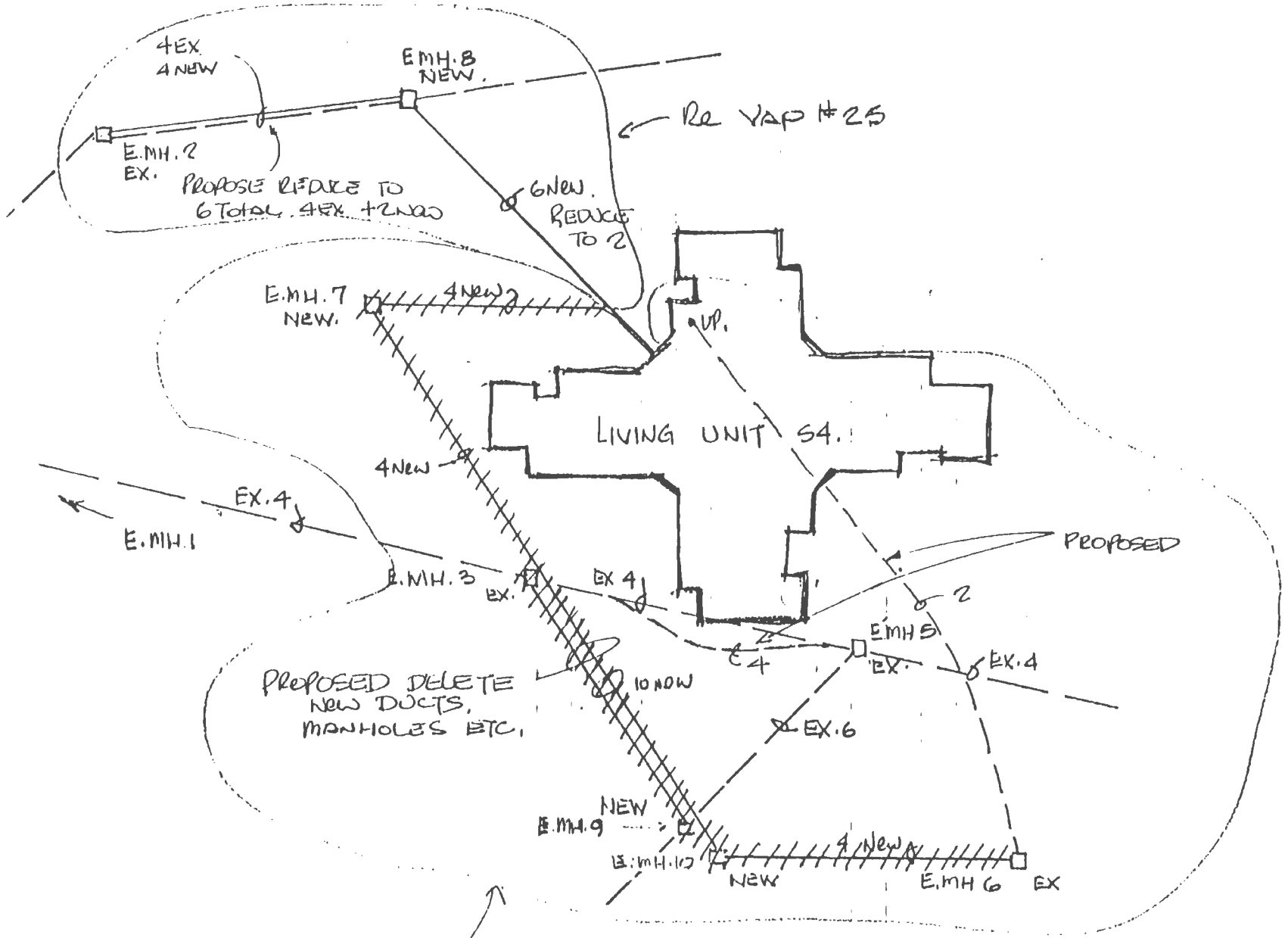
ADD 2-4" DUCT 75m @ 100/m 7500

4-4" DUCT 25m @ 140/m 3500

11,000

NET SAVINGS 37,375 - 11,000 = 26,375

- Attach Hanscomb Summary Sheets E2, E3A & E4A with supporting details where appropriate.
- Establish cost models as required.
- Estimate or obtain operations and maintenance costs.



Re. VAP # 24

PART SITE PLAN WAREWORTH.
NOT TO SCALE.



Subject: ELECTRICAL

VAP No.: E25

Item: NUMBER OF DUCTS

Date: _____

Revision: _____

Related Proposals	Baseline Value	Savings	
		Capital LCC	Energy O & M
	\$ 10,000		

Baseline:

Drawings show 8 - 4" ducts from existing M.H. #2 to #8 and 6 new 4" ducts into building.

Proposed:

Reduce no of ducts from M.H. #2 to 8 to 6 ducts (4 existing and 2 new) and into building with 2 ducts (future loop system, 1 in and 1 out) emergency switched and building 19.

Advantages

Disadvantages

Reduced cost.
Spare feeder provided from building #19.

No spare ducts.

Savings

~~Capital Cost:~~ \$3,600

~~Life Cycle Cost:~~

~~Classification:~~ A2



OCT 3/85

Person responsible for estimate: A. C. WRIGHT

Estimate Summary:

REDUCE NO OF ELECTRICAL DUCTS

DELETE	4-4" DUCTS	24m @ 145/m =	3475
	6-4" DUCTS	33m @ 180/m =	5950
			<u>\$ 9425</u>

ADD	2-4" DUCTS	24m @ 105/m =	2520
	2-4" DUCTS	33m @ 100/m =	3300
			<u>\$ 5820</u>

Net SAVINGS 9425 - 5820 = \$ 3605

\$
3600

- Attach Hanscomb Summary Sheets E2, E3A & E4A with supporting details where appropriate.
- Establish cost models as required.
- Estimate or obtain operations and maintenance costs.



Subject: ELECTRICAL

VAP No.: E26

Item: FEEDER SIZE

Date: _____

Revision: _____

Related Proposals	Baseline Value 18,000 \$	Savings	
		Capital	Energy
		LCC	O & M

Baseline:

400 amp, 600 V, 3 phase, 3 wire service - 2 runs of 3 #500 mcm + 1 #2/0
 240 m X \$75 = \$18,000

Proposed:

- 200 amp, 600 V, 3 phase, 3 wire - 2 runs of 3 #4/0 + 1 #2/0
 240 m X \$45 = \$10,800 (saving \$7,200)
- 100 amp, 600 V, 3 phase, 3 wire - 2 runs of 3 #2/0 + 1 #2/0
 240 m X \$30 = \$7,200 (saving \$10,800)

Advantages

Lower capital cost.

Disadvantages

Cannot tie into loop feeder at future date.

Savings

Alternatives

	1	2
Capital Cost:	\$7,200	10,800
Life Cycle Cost:	--	--
Classification:	C2	C3



Subject: ELECTRICAL

VAP No.: E27

Date: _____

Item: CONCRETE ENCASED BURIED DUCTS

Revision: _____

Related Proposals	Baseline Value	Savings	
		Capital LCC	Energy O & M
	\$ 34,325		

Baseline:

Concrete encased ducts at all locations.

Proposed:

Direct buried duct where there are no driveways or traffic over them.

1. As drawn per baseline.
2. If VAP E24 and E25 implemented.

Advantages

Easier to install.

Disadvantages

Could be damaged by heavy truck traffic.
 Not as protected when digging for other services.

~~Savings~~

~~Alternatives~~

	1	2
Capital Cost:	\$12,000	5,000
Life Cycle Cost:		
Classification:	C3	C3

Oct 3/95

Person responsible for estimate: A.C. WRIGHT.

Estimate Summary:

A) AS DRAWN. (CONCRETE ENCASED)

DELETE	10-4"	47m @ 285/m =	13,400
	6-4"	33m @ 180/m =	5,950
	4-4"	107m @ 140/m =	14,975
			<u>\$ 34,325.</u>

(DIRECT BURIED)

ADD	10-4"	47m @ 185/m =	8695
	6-4"	33m @ 120/m =	3960
	4-4"	107m @ 90/m =	9630
			<u>\$ 22,285</u>

(Net SAVINGS 34,325 - 22,285 = 12,040)
 say \$ 12,000

B) IF VAP # 24 & 25 INCORP'd. (CONCRETE ENCASED)

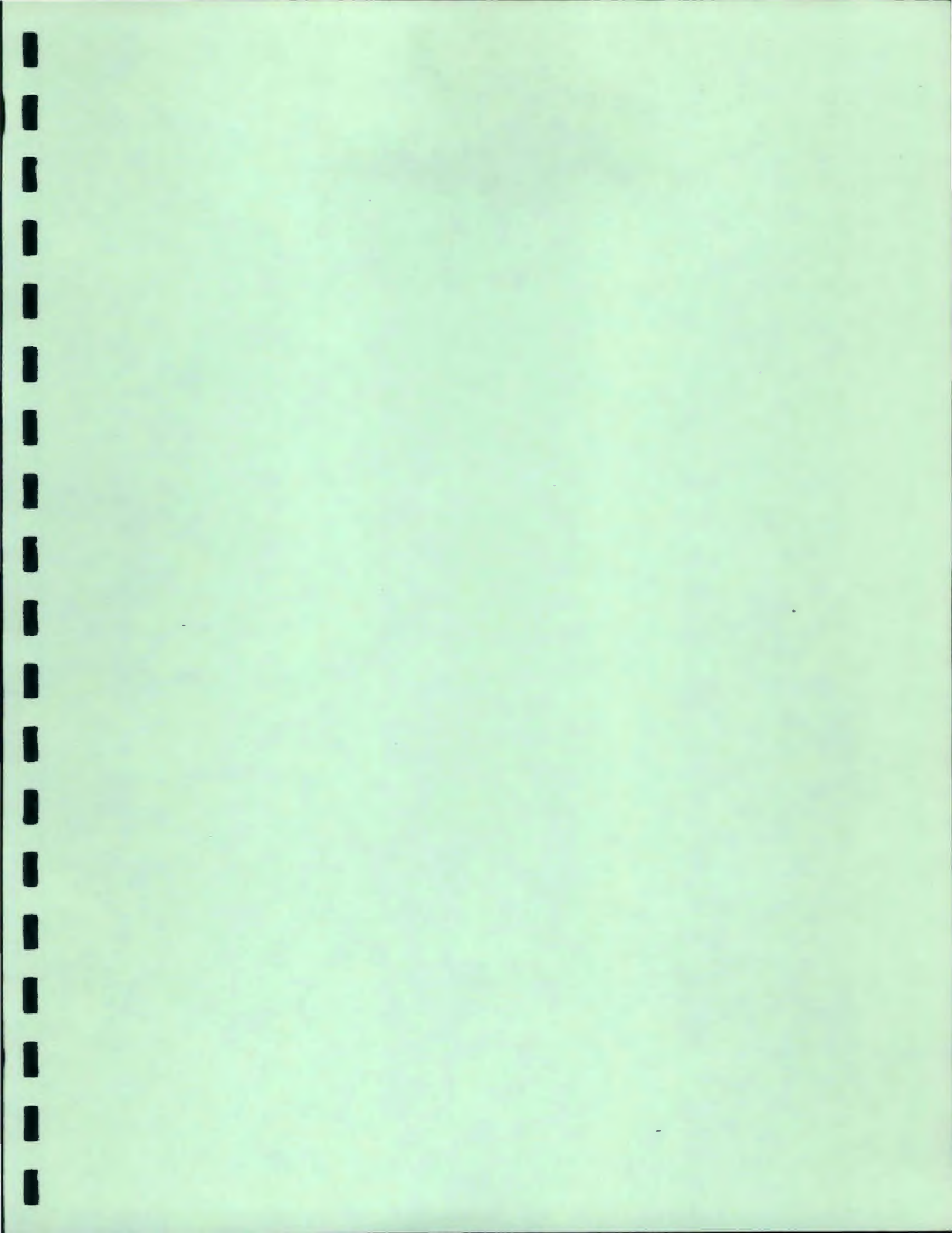
DELETE	4-4" DUCT	25 @ 140/m =	3500
	2-4" DUCT	75 @ 100/m =	7500
	2-4" DUCT	33 @ 100/m =	3300
			<u>14,300</u>

ADD	4-4" DUCT	25m @ 90/m =	2250
	2-4" Duct	75m @ 65/m =	4875
	2-4 Duct	33m @ 65/m =	2145
			<u>9270</u>

(Net SAVINGS 14,300 - 9270 = 5030)
 say \$ 5000

- Attach Hanscomb Summary Sheets E2, E3A & E4A with supporting details where appropriate.
- Establish cost models as required.
- Estimate or obtain operations and maintenance costs.

6. **SPACE PLANNING/
CONCEPT SUGGESTIONS**





SUMMARY OF VALUE ANALYSIS PROPOSALS

Section: SUMMARY OF SPACE PLANNING/CONCEPT SUGGESTIONS

VAP No.	V A P	Baseline Value	Savings (Increase)		Class
			Capital	O&M(PV)	
SP1	Reduce multi-purpose rooms to two.	--	36,000	--	--
SP2	Group administration functions.	--	12,000	--	--
SP3	Combine ludo and interview functions.	--	12,000	--	--
SP4	Reduce sally port and lobby area.	--	16,000	--	--
SP5	Locate electrical room outside.	--	--	--	--
SP6	Double load dayroom on two wings.	--	212,000	--	--
SP7	Double load dayroom on all wing.	--	183,000	--	--
SP8	Tapered wing cruciform massing configuration.	--	231,000	--	--

A - Accepted, P - Pending, R - Rejected



Subject: SPACE PLANNING/CONCEPT SUGGESTIONS

VAP No.: SP1

Item: REDUCE MULTI-PURPOSE ROOMS TO TWO

Date: _____

Revision: _____

Related Proposals	Baseline Value	Savings	
		Capital LCC	Energy O & M
	\$		

Baseline:

4 multi-purpose rooms with a total area of 86 m².

Proposed:

Retain 2 multi-purpose rooms adjacent to interview rooms - omit two rooms in single storey section either side of main entrance. Area reduction 44 m².

Advantages

Disadvantages

Reduced cost.

Reduction of inmate amenities.

Reduced building volume.

Potential space for additional cells.

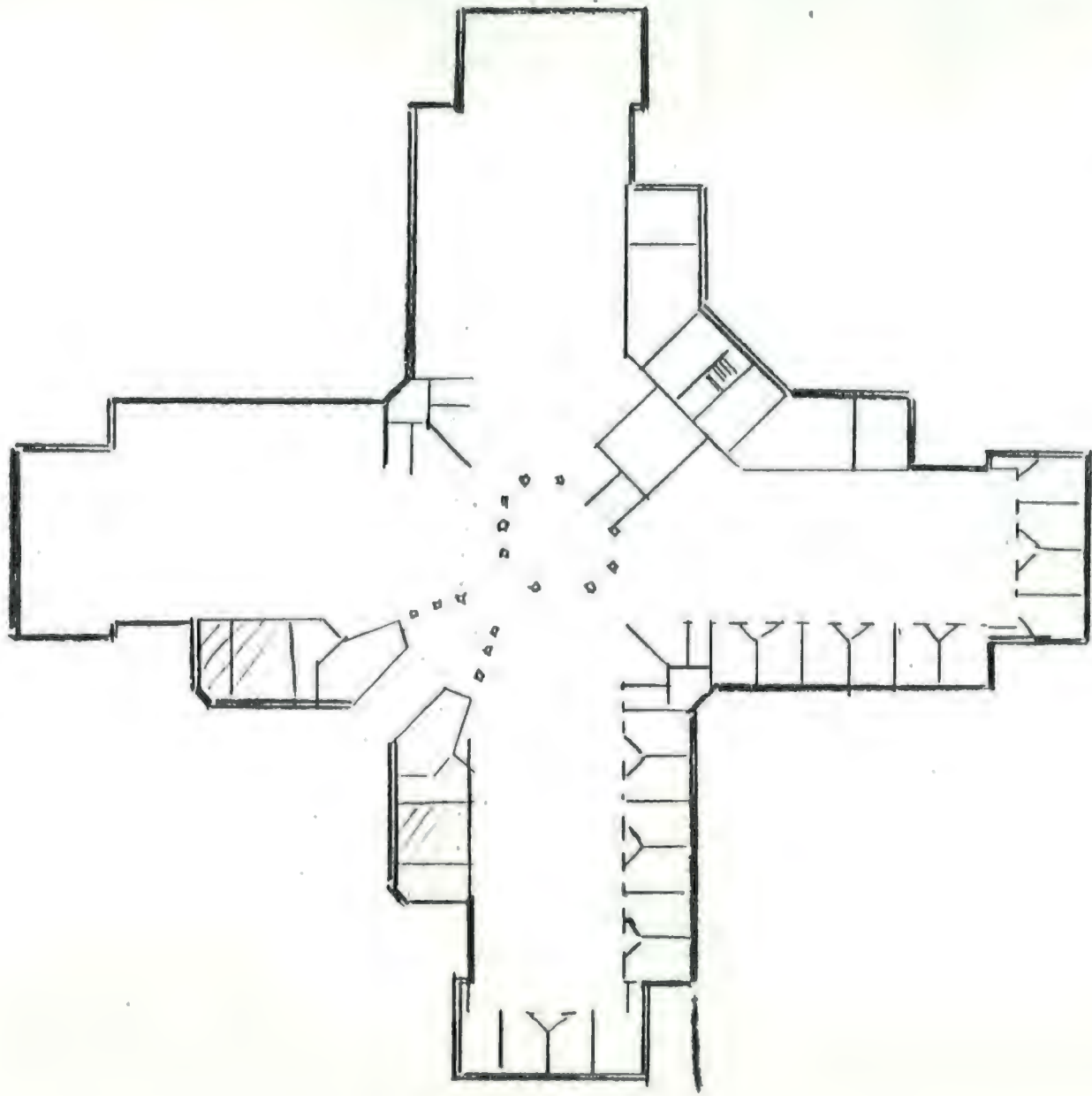
Better daylighting of dayroom.

Savings

Capital Cost: \$36,000

Life Cycle Cost: --

Classification: --



AREA EXISTING



AREA ADDITION



VA.

GROUND
FLOOR
PLAN

ON
 11
 20

	QUANTITY	RATE	\$
Overall Total			
<u>2/50 x 4-9. Shell</u>			
Foundation	40 m ²	2000	2000
Slab on grade	4 m ²	29.25	117.0
Roof structure	12 m ²	28.00	336.0
Roof finish	49 m ²	65.00	3185.0
Chairs	11		
<u>Interior Finishes</u>			
Services	24 m ²		116.10
Door	5	240.00	1200.0
Wall	27 m ²	50.00	1350.0
Floor Finish	10	19.00	190.0
Ceiling Finish	49 m ²	7.00	343.0
Wall Finish	126	9.90	1247.4
Electrical	19	130.00	2470.0
Mechanical	69	85.00	5865.0
			<u>\$ 36,102</u>



Subject: SPACE PLANNING/CONCEPT SUGGESTIONS

VAP No.: SP2

Item: GROUP ADMINISTRATION FUNCTIONS

Date: _____

Revision: _____

Related Proposals	Baseline Value \$	Savings	
		Capital LCC	Energy O & M

Baseline:

Staff toilet behind control room. Staff changing room next to entrance. Separate office for LU supervisor.

Proposed:

The staff toilet and change room be combined behind the control room and space be allocated in control room for LU supervisor desk, etc. The meeting room could be expanded without affecting sight lines to maintain area or provide space for LU supervisor office. Single storey extension can be reduced by 33 m² adjacent to main entrance with janitor rooms relocated to part of current areas 1002 and 1095.

Note: If stair 7 is relocated outside (see VAP SP6) 13 m² additional space is available for change room, or group meetings.

Advantages

Disadvantages

Secure access to staff change.

Reduced inmate amenity area.

More compact administration space.

Reduced building area, volume and cost.

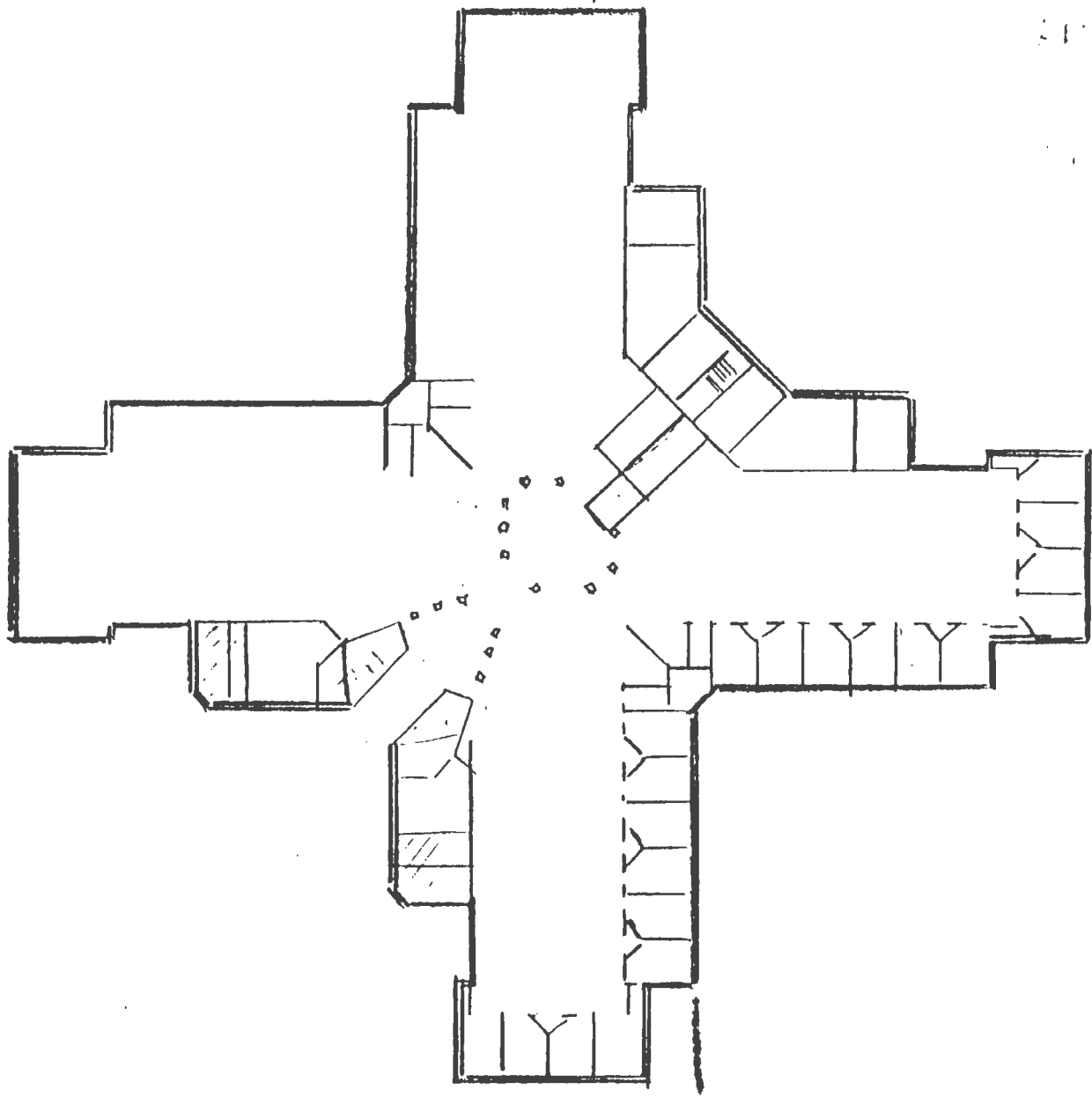
Potential for additional cells.

Savings

Capital Cost: \$12,000

Life Cycle Cost: --

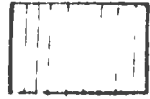
Classification: --



2nd FLOOR PLAN



1st FLOOR PLAN



V. S. S.

GROUND
FLOOR
PLAN

Scale: 1/4" = 1'-0"
 Date: 10/10/54
 City: New York

LO Supervisors Control
 Room & concrete slab
 Washrooms

Men. Sanitary area into
 relocated areas

- 4.9 x 2.1 x 2

Foundation

4 m

200

800

Substructure

20 m²

2000

4000

Roof

20 m²

810

1620

Roof finish

20 m²

600

1200

Interior wall

20 m²

675

1350

Doors

2 Nos

600

1200

F.F.

20 m²

195

390

WF

90 m²

900

891

CF

20 m²

800

1600

Elec

20 m²

1000

2000

Mech

20 m²

850

1700

8

11872



Subject: SPACE PLANNING/CONCEPT SUGGESTIONS

VAP No.: SP3

Item: COMBINE LUDO AND INTERVIEW FUNCTIONS

Date: _____

Revision: _____

Related Proposals	Baseline Value \$	Savings	
		Capital LCC	Energy O & M

Baseline:
 Two ludo offices area 18.4 m² and two interview rooms area 17.6 m².

Proposed:
 Relocate ludo office and combine with interview rooms to reduce single storey extension by 18 m².

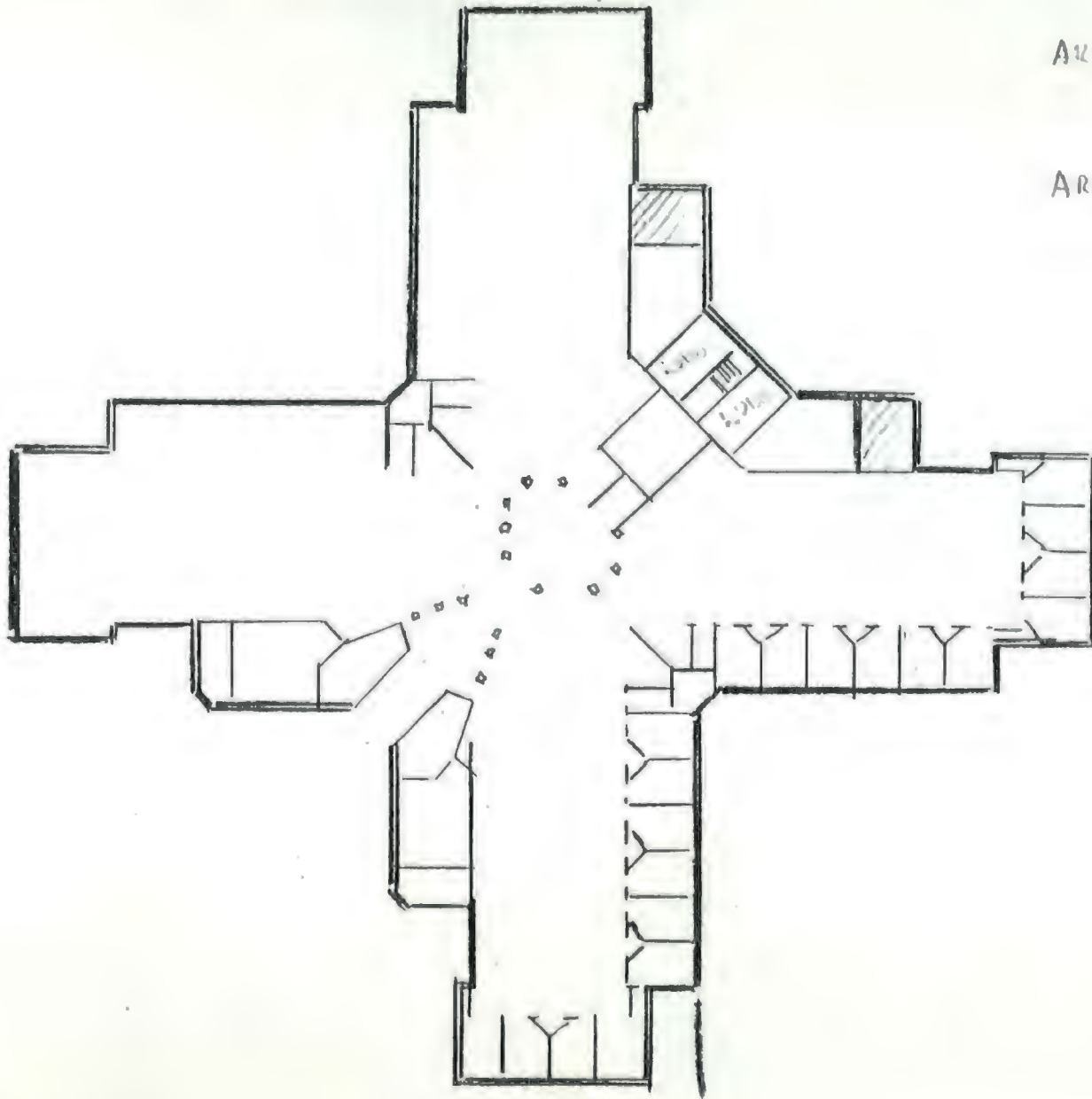
Advantages	Disadvantages
Reduced building area, volume and cost.	Planning of space use.
Potential space available for additional cells.	Loss of security of files stored in ludo offices.

Savings

Capital Cost: \$12,000

Life Cycle Cost: —

Classification: —



AREA REDUCTION



AREA ADDITION



VARIATION 3

GROUND
FLOOR
PLAN

1st 1 1 1
2nd 1 1 1

	QUANTITY	RATE	\$	
<u>DOOR AND INTERVIST</u>				
92 m ²				
Foundation	5 m ²	200 ⁰⁰	1000	
Slab on grade	18 m ²	26 ⁰⁰	468	
Roof construction	18 m ²	31 ⁰⁰	558	
Roof finish	18 m ²	60 ⁰⁰	1080	
Interior wall	15 m ²	15 ⁰⁰	2250	
Door	2 1/2	500 ⁰⁰	1250	
Floor	18 m ²	19 ⁰⁰	342	
Cis. floor	18 m ²	28 ⁰⁰	504	
Wall finish	22 m ²	37 ⁰⁰	814	
Floor tile	18 m ²	33 ⁰⁰	594	
Water main	18 m ²	30 ⁰⁰	540	

\$ 12375



Subject: SPACE PLANNING/CONCEPT SUGGESTIONS

VAP No.: SP4

Item: SALLY PORT AND LOBBY

Date: _____

Revision: _____

Related Proposals	Baseline Value \$	Savings	
		Capital	Energy
		LCC	O & M

Baseline:

Entrance lobby area of 29 m² with glazed screen and steel roof.

Proposed:

Exterior walls returned in to line of two storey section. With exterior entrance doors set on line of upper floor and smaller sally port as lobby to maintain specified distance from control room and smoke divisions. Area reduction is 19 m². Doors can be set back so that slab above provides a canopy. Door to 1002 either becomes exterior type or is relocated to open into dayroom.

Advantages

Disadvantages

Reduction in enclosed volume.

Increased exterior cladding.

Reduction in sally port screen.

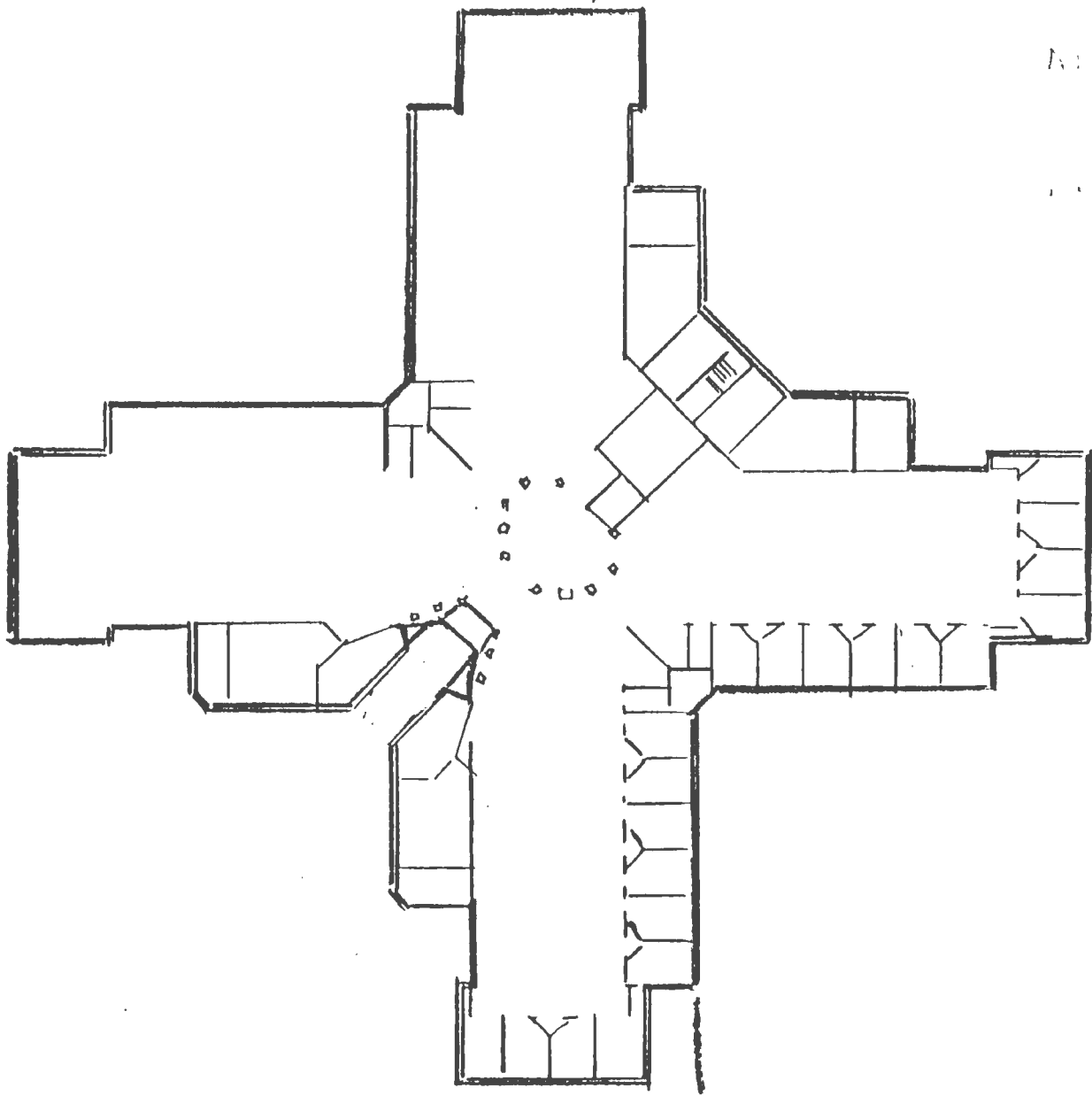
Access to staff changing room from outside.

Savings

Capital Cost: \$16,000

Life Cycle Cost: --

Classification: --



Room 1

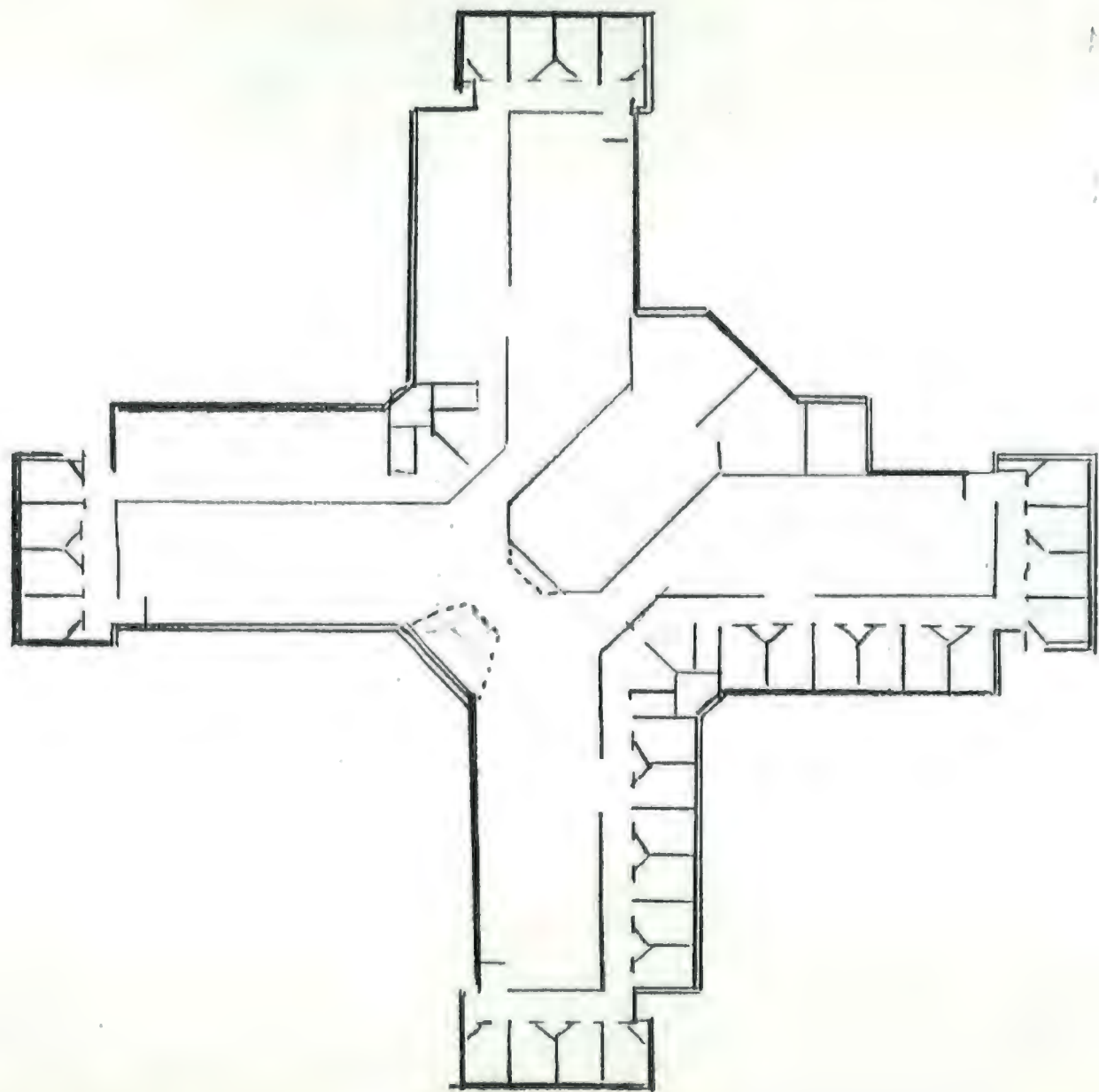


Room 2



GROUND
FLOOR
PLAN

1/1/1911
1/1/1911



NEW REDUCED



NEW REDUCED



SECOND
FLOOR
PLAN

37.12

	QUANTITY	RATE	\$
OMIT SAND PM			
OMIT Slab concrete = Add paving			-
OMIT Security 200mm block interior walls 2/6.0 x 3.2	38 m ²	90 ⁰⁰	3420
OMIT concrete construction 2/6.8 x 2.8 1.5 x 1.5	21 m ²	81 ⁰⁰	1701
OMIT Plaster Finish	21 m ²	60 ⁰⁰	1260
OMIT Quarry Tile	18 m ²	75 ⁰⁰	1350
OMIT Ceiling Finish	18 m ²	8 ⁰⁰	144
OMIT Aligned screen (ext)	19 m ²	92 ⁰⁰	9368
OMIT Steel rod arch screen (ext)	13 m ²	458 ⁰⁰	5954
OMIT Exterior cladding Finish	2.25 m ²	81	182
<u>ADD</u> Internal walling (security) 2/2.2 x 2.0	11 m ²	90 ⁰⁰	(990)
<u>ADD</u> Exterior walling 2/6.7 x 3.65	49 m ²	175 ⁰⁰	(8575)
<u>ADD</u> Exterior single door 4.0	1 No	750	(750)
OMIT Elec	18 m ²	102 ⁰⁰	1836
OMIT Mech	18 m ²	61 ⁰⁰	1098
<u>ADD</u> Exterior concrete paving See pg 1			15975



Subject: SPACE PLANNING/CONCEPT SUGGESTIONS

VAP No.: SP5

Item: ELECTRICAL ROOM

Date: _____

Revision: _____

Related Proposals	Baseline Value	Savings	
		Capital LCC	Energy O & M
	\$		

Baseline:

Electrical room of 13 m² on second floor with main distribution through ludo office.

Proposed:

Relocate electrical room as separate attached building of lighter construction.

Advantages

Disadvantages

Better access.

Nil

Frees up space for double loading or additional cells.

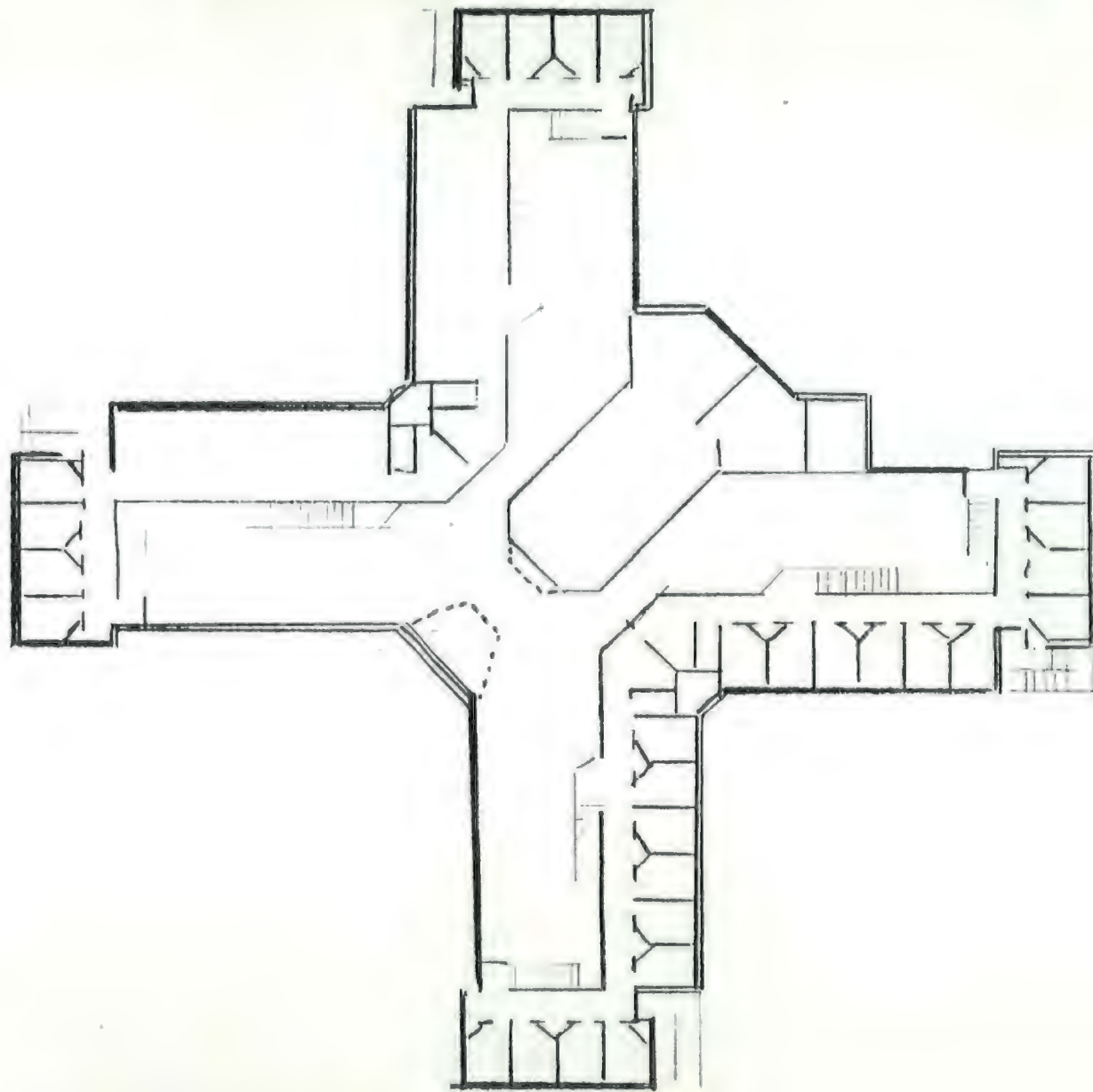
Savings

Capital Cost: No change

Life Cycle Cost: _____

Classification: _____

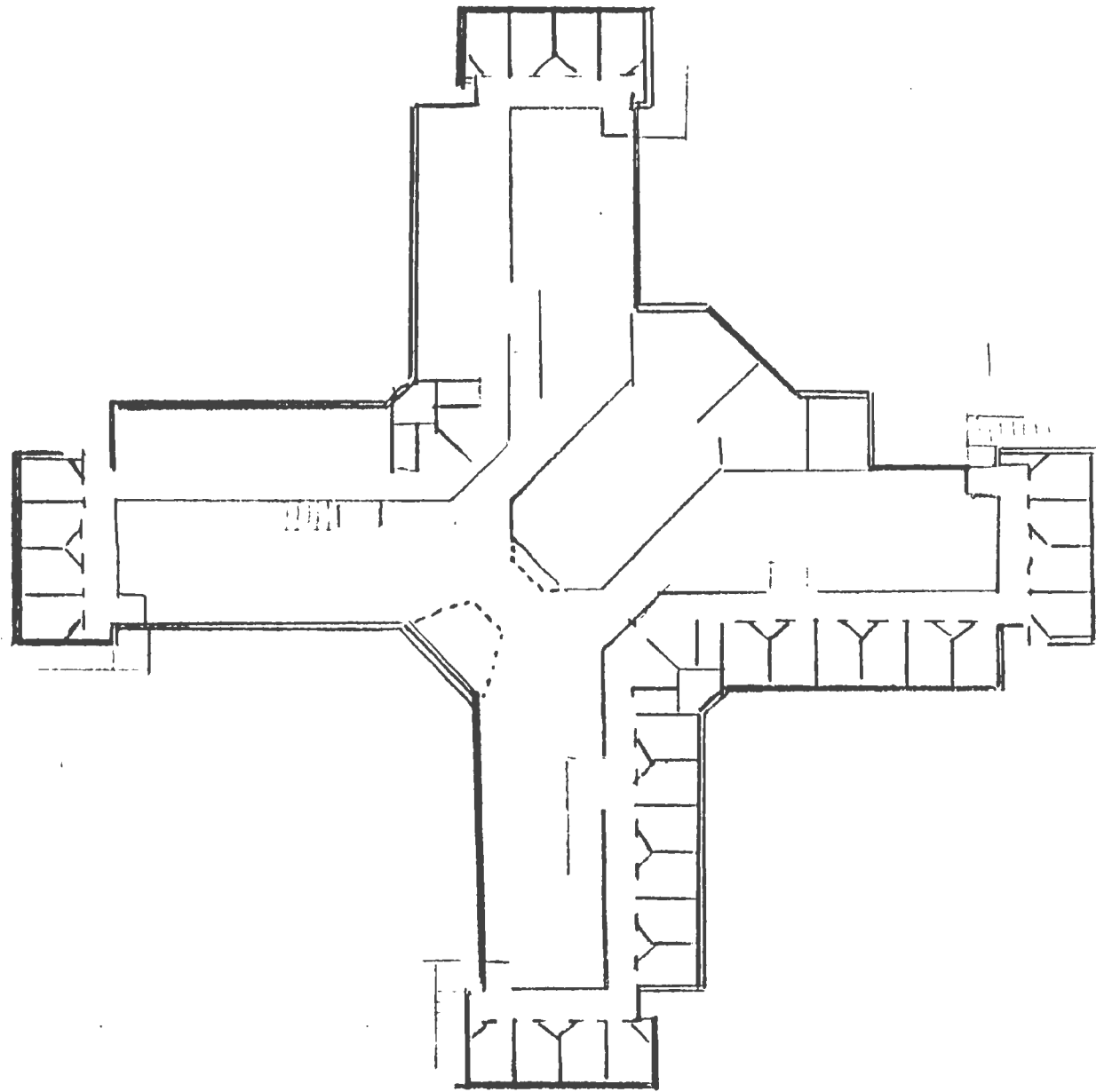
	QUANTITY	RATE	\$
Move - - - - - room to Exterior			
Omit. of - - - - - Room	13 m ²	85 ⁰⁰	1105
Omit. of - - - - - wall	24 m ²	50 ⁰⁰	1200
Omit. - - - - -	11 m ²	55 ⁰⁰	605
Unit. - - - - -	13 m ²	35 ⁰⁰	455
Cl. finish	13	8 ⁰⁰	104
Wall finish	48 m ²	90 ⁰⁰	432
Omit. - - - - - wall	11 m ²	50 ⁰⁰	550
(- - - - - ends)			
Omit. - - - - -	3 m ²	450 ⁰⁰	1350
<u>Net</u> - - - - -			6779
<u>Net</u> - - - - -			5000
			1779



VII-51

SECOND
FLOOR
PLAN

FLOOR
PLAN



V.P. 217

SECOND
FLOOR
PLAN

11. 11.



Subject: SPACE PLANNING/CONCEPT SUGGESTIONS

VAP No.: SP6

Item: DOUBLE LOADED DAYROOM ON TWO WINGS ONLY

Date: _____

Revision: _____

Related Proposals	Baseline Value \$	Savings	
		Capital LCC	Energy O & M

Baseline:
 6 cells per wing per floor one side of dayroom with 4 cells at end.

Proposed:
 10 cells per wing per floor either side of dayroom with exterior staircase exits, and daylighting from end (see sketch for double loading two wings only).

Advantages	Disadvantages
Reduced area and volume.	Reduction in inmate amenities.
Shorter service runs.	Cells facing entrance.
Better location of fire escape stairs.	Multi-purpose rooms on second floor.
Double loading of all service shafts in wing.	

Savings

Capital Cost: \$222,000

Life Cycle Cost: --

Classification: --

Subject: SPACE PLANNING/CONCEPT SUGGESTIONSVAP No.: SP6Item: DOUBLE LOADED DAYROOM ON TWO WINGS ONLY

Page: _____

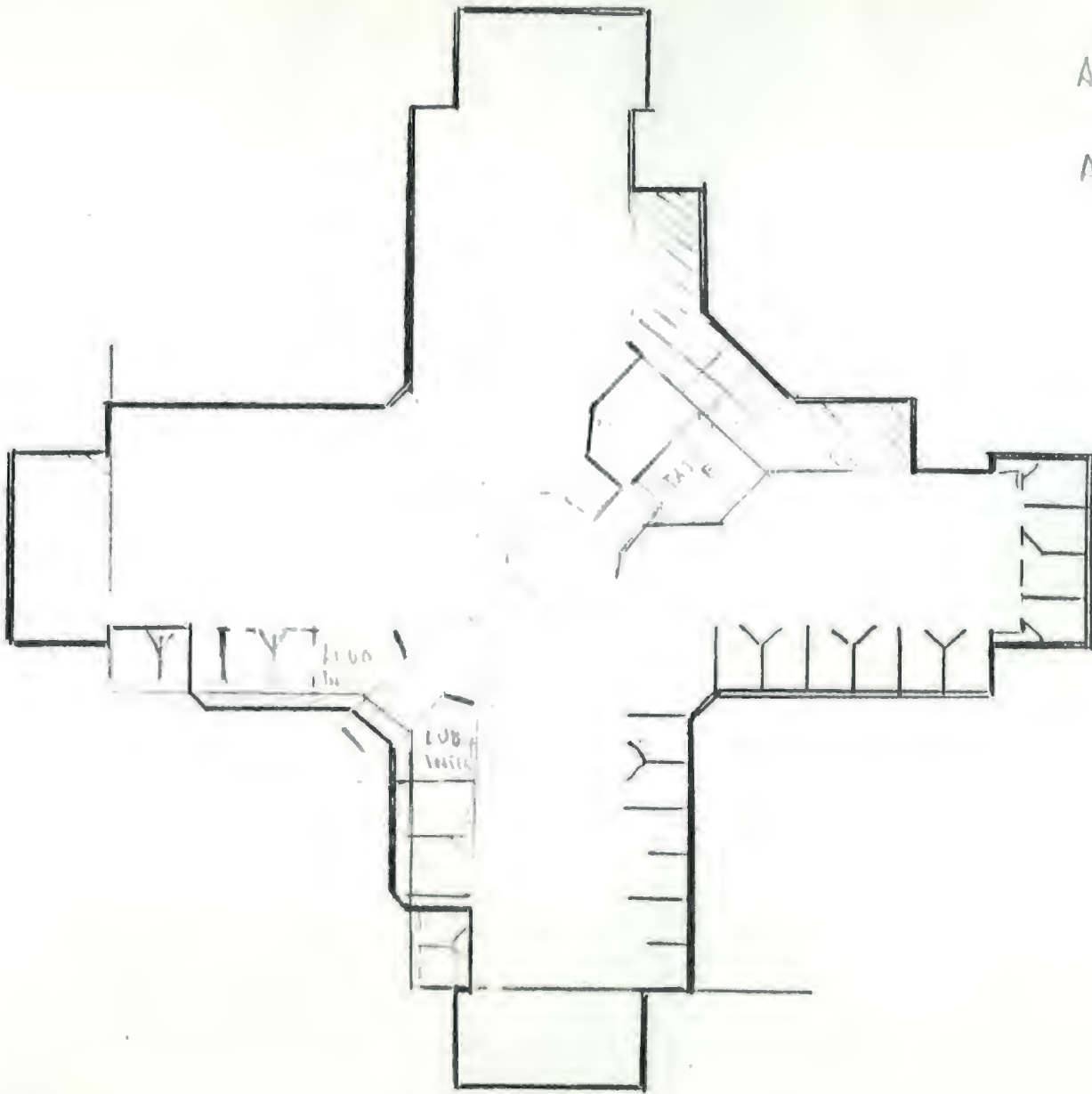
Revision: _____

Analysis:This sketch also indicates multi-purpose use of other areas and the following:

- i) exterior staircase to mechanical room;
- ii) ludo multi purpose rooms on second floor;
- iii) janitors on second floor;
- iv) ludo offices used for interview;
- v) LU supervisor office in control room;
- vi) staff washrooms grouped behind control room.

Gross functional areas provided become:

	Proposal (m ²)	Baseline (m ²)
Cells	770	770
Inmate amenities	99	150
Dayrooms	1083	1075
Staff amenities	20	20
Administration	69	92
Ludo	40	40
Janitors	33	33
Mechanical & electrical	<u>140</u>	<u>230</u>
Total GFA	2254	2410
Total reduction in GFA from prototype	156 m ²	
Total reduction in volume from prototype	27,545 c.f.	



APP - RES



ANGI



VI. CP6

GROUND
FLOOR
PLAN

DOUBLE LOADING DAYROOMS

QUANTITY

RATE

\$

TWO WINGS ONLY

E. Side

Redundant Area

GF

GF

2nd

Wet Area 150 m²

7

Group Meeting Room

-51

6

1/25

entires

-23

1/11

15

LUDO

Mechanical

-90

REDUCT V.C. 12

780 m²

27,500 \$

	QUANTITY	RATE	\$
Shell Cost Adjustments			
		136 ³²	21160
		6.11	9035
		35.11	22205
	163	859.0	17102
		86.20	17163
		175.00	17500
	240 m ²	106.07	25456
	240 m ²	48.00	11520
		80.00	15200
	8 km ²	80.00	3350
		30.00	2400
FUNCTIONAL AREA INTERIOR COST ADJUSTMENTS			
Cells	NO CHANGE		
Prisoner Amenities	DEDUCT	51 m ²	210.00
DAYROOM CIRCULATION	ADD	8 m ²	39.50
Staff Amenities			(3196)
ADMINISTRATION	DEDUCT	23 m ²	1575.58
KUDO	NO CHANGE		36248
JAN STORAGE	NO CHANGE		
MECH SPACE	DEDUCT	90 m ²	32110
			222490

DOUBLE LOADING DAY 2-1-13 TWO WITHAS ONE - (cont)	QUANTITY	RATE	\$	
Provide for Electrical room outside				
Footings	13m ²		500.	
SOA	13m ²	35 ⁰⁰	455.	
Roof construction of unit	13m ²	145 ⁰⁰	1885	
Walls	20m ²	105 ⁰⁰	2100	
Finishes	13m ²	50 ⁰⁰	650	
Lighting & Vent	13m ²	100 ⁰⁰	1300	
			6950	= 532 ⁰⁰ / m ²



Subject: SPACE PLANNING/CONCEPT SUGGESTIONS

VAP No.: SP7

Item: DOUBLE LOADED DAYROOMS ON ALL WINGS

Date: _____

Revision: _____

Related Proposals	Baseline Value	Savings	
		Capital	Energy
		LCC	O & M
	\$		

Baseline:

All as SP6.

Proposed:

10 cells per wing per floor either side of dayroom with staircase exists and daylighting from end (see sketch for double loading all wings).

Advantages

Disadvantages

Reduced area and volume.

Reduction in inmate amenities.

Shorter service runs.

Cells facing entrance.

Better location of fire escape stairs.

Multi-purpose rooms on second floor.

Double loading of all service shafts in wing.

Savings

Capital Cost: \$183,000

Life Cycle Cost: --

Classification: --



Subject: SPACE PLANNING/CONCEPT SUGGESTIONS

VAP No.: SP7

Item: DOUBLE LOADED DAYROOMS ON ALL WINGS

Page: _____

Revision: _____

Analysis:

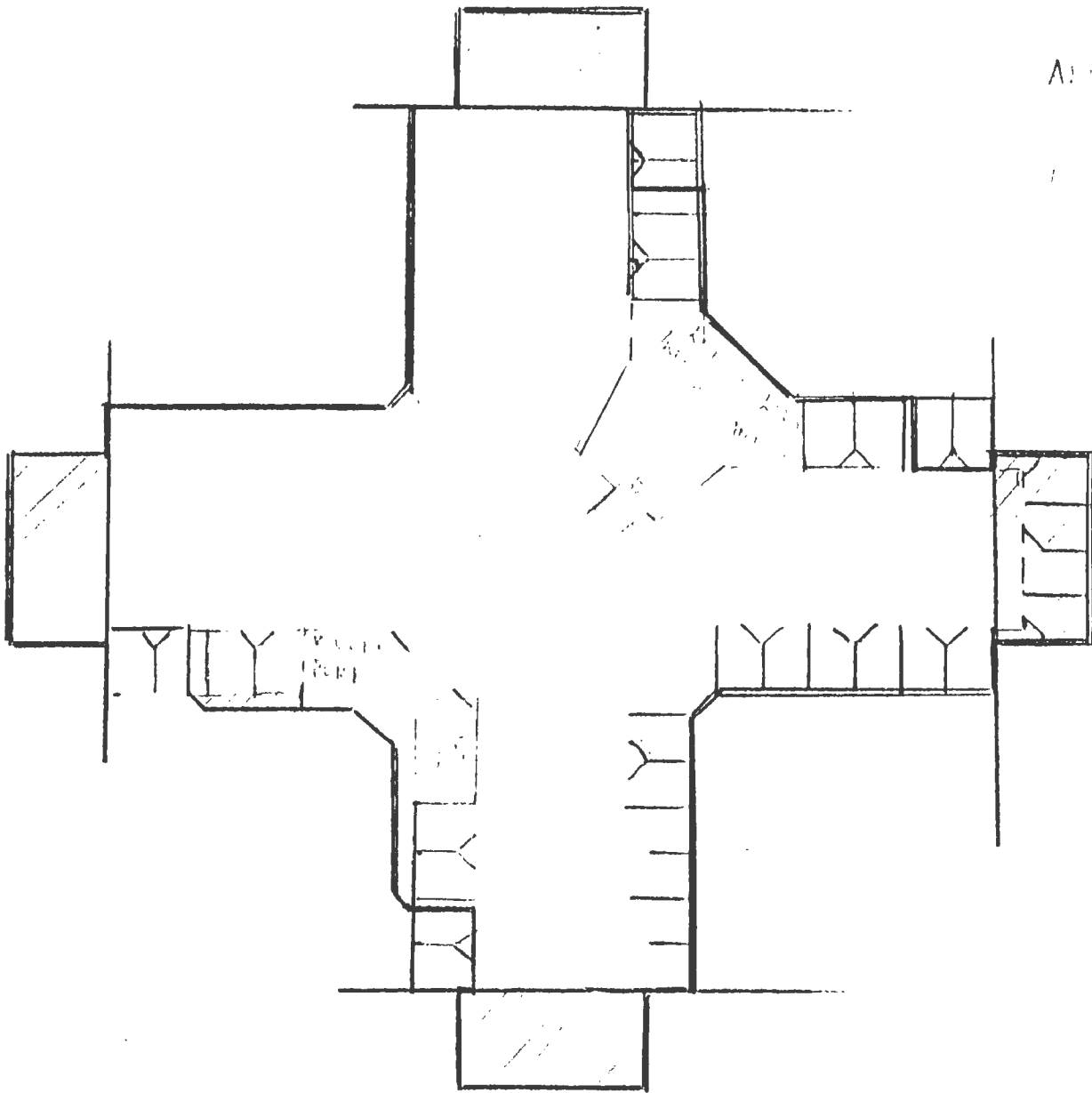
~~The sketch illustrating double loading of wings illustrates multi-purpose use of certain areas and space changes noted in VAP SP6.~~

~~Gross functional areas provided become:~~

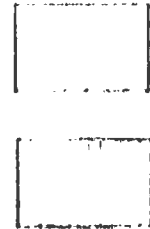
	<u>Proposal</u>	<u>Baseline</u>
	(m ²)	(m ²)
Cells	770	770
Inmate amenities	73	150
Dayrooms	1171	1075
Staff amenities	20	20
Administration	69	92
Ludo	40	40
Janitors	33	33
Mechanical & electrical	<u>186</u>	<u>230</u>
Total GFA	2362	2410

Total reduction in GFA from prototype 48 m²

Total reduction in volume from prototype 24,790 c.f.



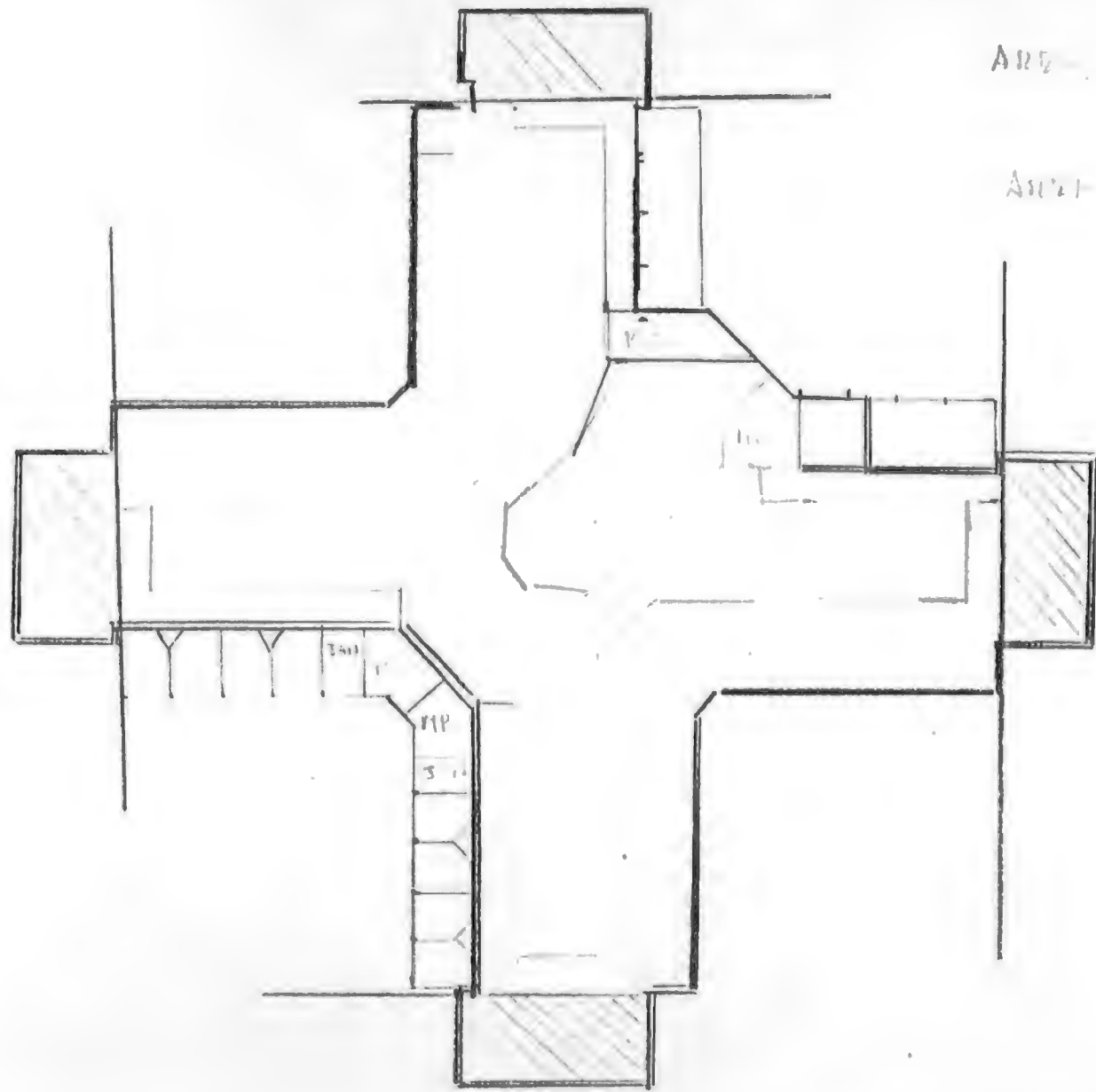
Area 1
Area 2



VAN 7

GROUND
FLOOR
PLAN





AREA RESERVATION



AREA RESTRICTION



VAL 17

SECOND
FLOOR
PLAN

	QUANTITY	RATE	\$
ALTERNATIVE			
Omit Foundation	173 m ²	105 ⁰⁰	
Omit Substructure	173 m ²	45 ⁰⁰	7900
Omit Superstructure	43 m ²	108 ⁰⁰	4663
Omit Roof Construction	173 m ²	85 ⁰⁰	14805
Omit Roof Finish	173 m ²	86 ²⁰	14930
Omit Cladding	154 m ²	170 ⁰⁰	26180
Omit Mechanical	248 m ²	100 ⁰⁰	24800
Omit Electrical	225 m ²	53 ⁰⁰	11925
ADD Carleton walkways	165 m ²	30 ⁰⁰	(4950)
ADD Balustrade	84 m	80 ⁰⁰	(6720)
ADD LIGHTING units	96 m ²	30 ⁰⁰	2880
ADJUST FUNCTIONAL AREA			
CELLS	NO CHANGE		
PRINCIPAL AMENITIES	-77	80 ⁰⁰	(6160)
DAYLOAF CIRCULATION ADD	+ 96 m ²	399 ⁵⁰	(38356)
STAFF FACILITIES	NO CHANGE		
RECREATION	-23	1575 ⁹⁸	36248
LUDO	NO CHANGE		
JAN/STORAGE	NO CHANGE		
MECH SPACE	-44	379 ⁰⁰	16676
Net Reduction			<u>183352</u>

DOUBLE LOAD DAY ROOMS
ALL WINGS.

QUANTITY

RATE

\$

See Sketch

Reduced Areas.

APR 500 1/2

Red

Cladding

2/4 10x5	200	400	200	200	200	1/5x7	140
2/9.0x1.0	18	18	18	18	18		
3.0x1.0	3	3	3	3	3		
	221	221	200	221	221		

All

2/2 3.0x2.0	196	43	48	25			
3.3x4.0	13	13	13				
7.0x2.0	28	28	28				
2/20x2.0	48	48	48		2.5	140	
5.0x2.0	20	20	20				
	173	173	43	173			

Add

Central Wash

1/6x2.0							
4/5x2.0	108						

Net Reduction CFA 48m²

New Finished Area

Cells	No. of Cells =
Provision for...	- 77
Day rooms (72m ²)	+ 96
Stair...	
Sanitation...	- 22
LUDO	
...	- 44
	- 48 m ²

REDUCED BUILDING VOLUMES

702m³ = 24,790 cu



Subject: SPACE PLANNING/CONCEPT SUGGESTIONS

VAP No.: SP8

Item: TAPERED WING (CRUCIFORM) MASSING CONFIGURATION

Date: _____

Revision: _____

Related Proposals	Baseline Value \$	Savings	
		Capital	Energy
		LCC	O & M

Baseline:

Rectangular wing with 4 cells at end and 6 along one side on each floor each wing.

Proposed:

All wing tapered towards ends to a width that only provides for upper level walkways and 1½ m for end staircase.

Advantages

Better visual aspects to cells.
More interesting building shape.
Reduced area and volume of dayrooms.

Disadvantages

Some awkward shapes rooms.
Additional cutting of precast roof panels.

Savings

Capital Cost: \$226,000

Life Cycle Cost: --

Classification: --



Subject: SPACE PLANNING/CONCEPT SUGGESTIONS

VAP No.: SP8

Item: TAPERED WING (CRUCIFORM) MASSING CONFIGURATION

Page: _____

Revision: _____

Analysis:

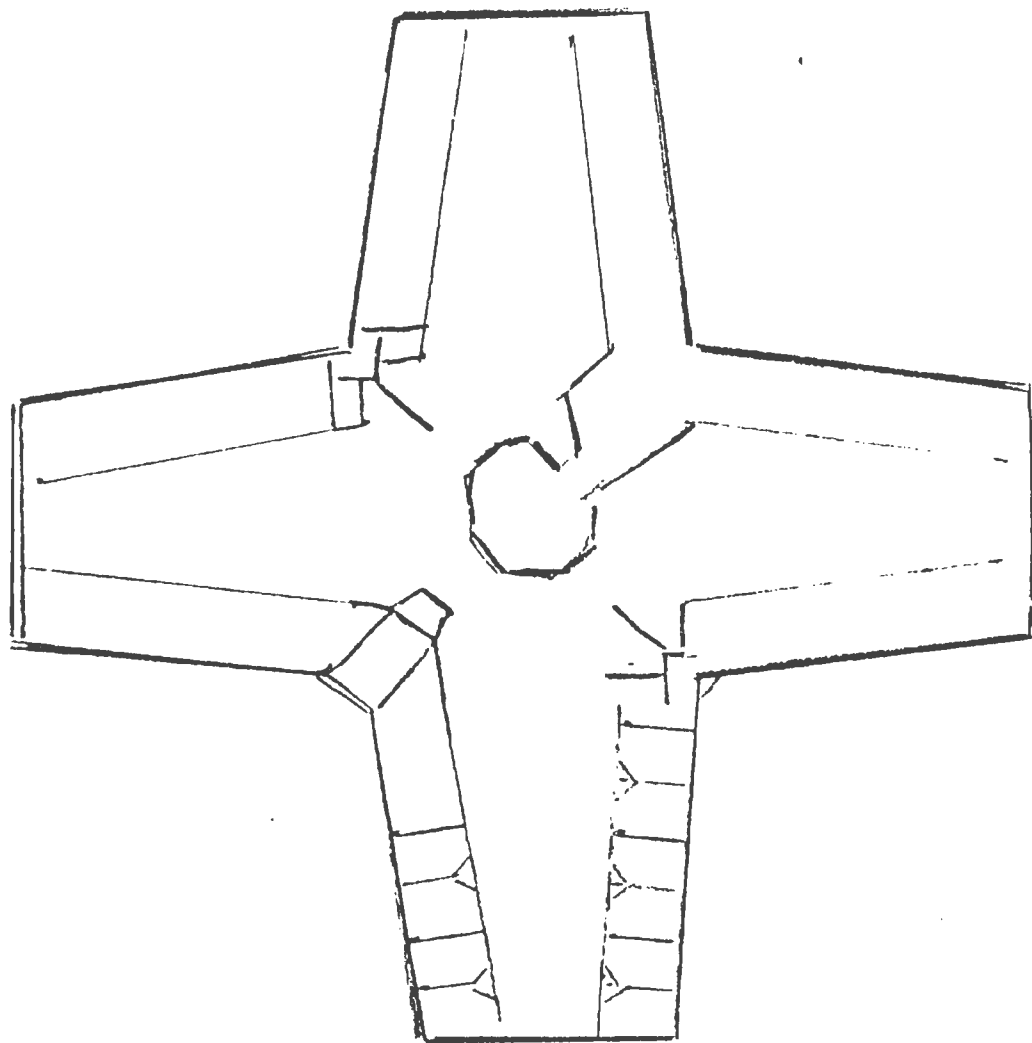
This proposal includes double loading of all wings as proposed in VAP SP9, an the exterior staircase to mechanical room. Double function of ludo offices as interview rooms, multi purpose rooms on the second floor.

Gross functional areas provided become:

	<u>Proposed</u>	<u>Baseline</u>
	<u>(m²)</u>	<u>(m²)</u>
Cells	770	770
Inmate amenities	73	150
Dayrooms	1035	1075
Staff amenities	20	20
Administration	69	92
Ludo	40	40
Janitors	33	33
Mechanical & electrical	<u>186</u>	<u>230</u>
Total GFA	2226	2410

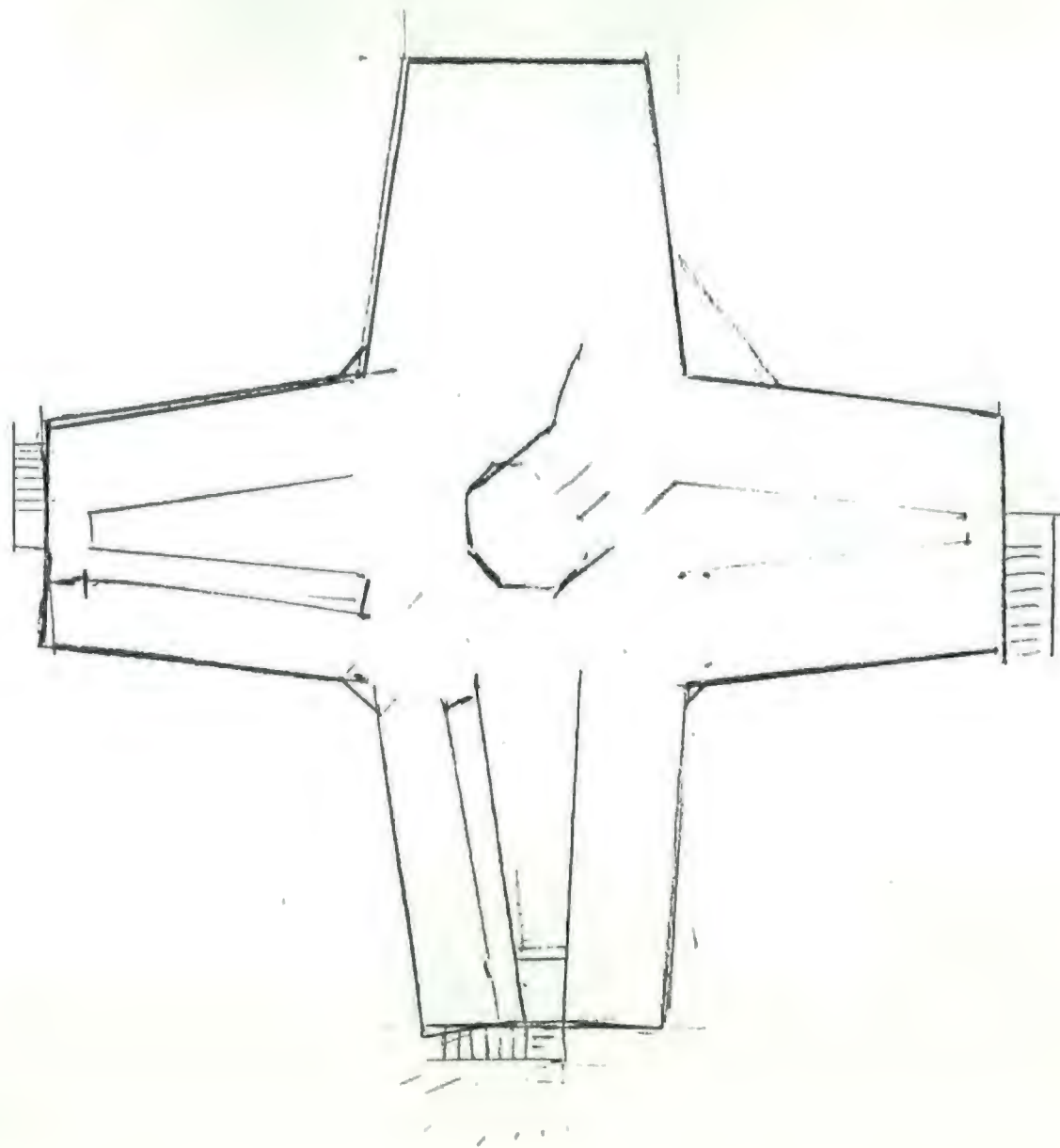
Total reduction in GFA from prototype 184 m²

Total reduction in volume from prototype 31,217 c.f.



VAP SP8

GROUND
FLOOR
TAPERED WING



VAP.SP8

SECOND
FLOOR
PLAN
TAPERED WING

CROCISSA / T.A. = 201 m

QUANTITY

RATE

\$

See Sheet

Assume area for Double load day room
all work.

Reduced Day room area =

$$2.0 \times 7.0 \times 2 \times 2 =$$

136 m²

Cost breakdown are

Paint Substruc

136 m²

45⁰⁰

6168

Paint Roof

136 m²

85⁰⁰

11560

Paint Roof finish

136 m²

86⁰⁰

11728

Paint painted ceiling

136 m²

80⁰⁰

10880

Paint floor finish

36 m²

1950

702

Paint exterior cladding

84 m²

175⁰⁰

14700

= 189

177 m²

12

48370

Assume Provision VAP SP7

TOTAL

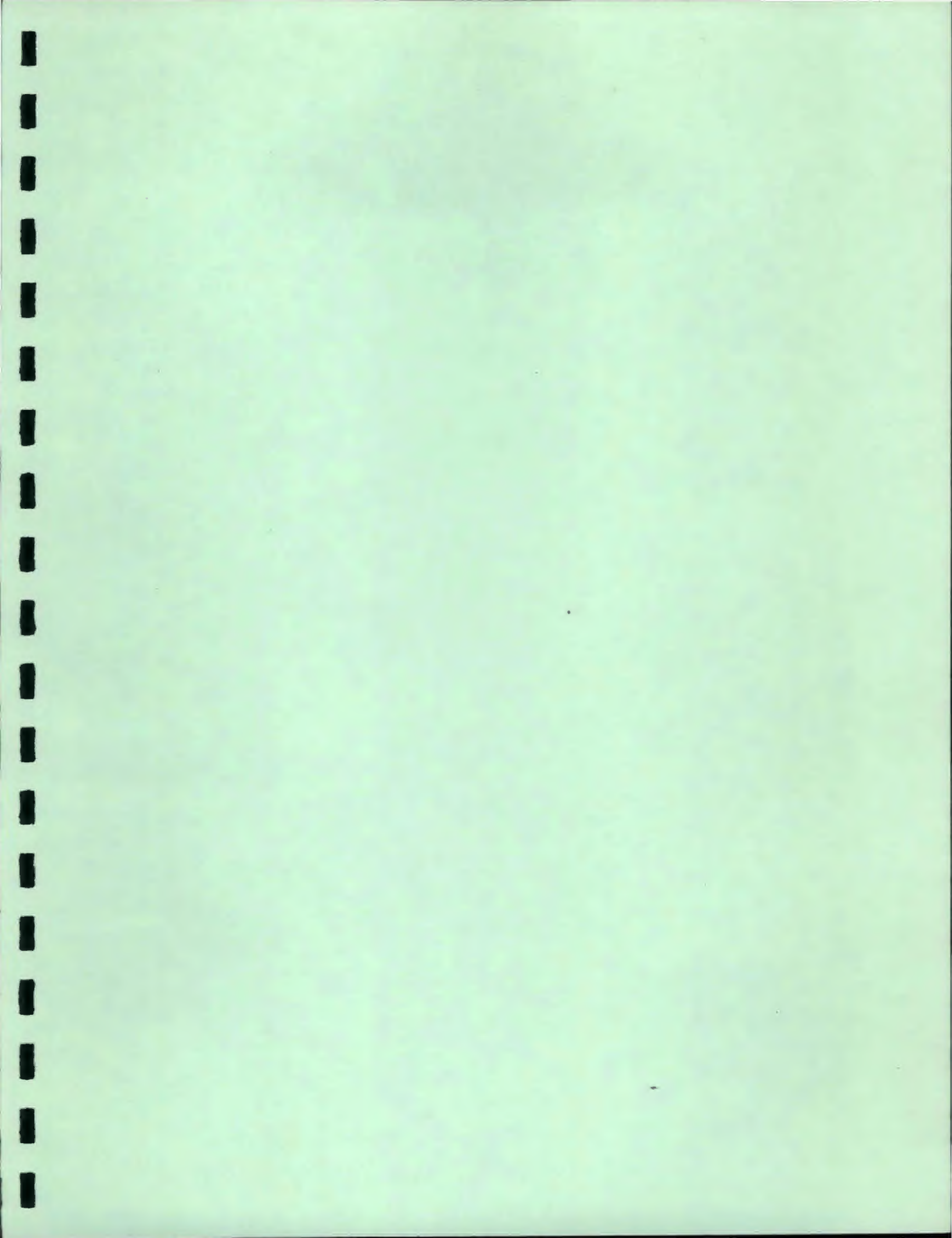
173000

231370

Reserve VAP

Reserve

APPENDIX A
PROJECT ESTIMATE SUMMARY



Element	Ratio to GFA	Elemental Cost		Elemental Amount		Rate per SF/M ²		%
		Quantity	Unit Rate	Sub-total	Total	Sub	Total	
1 Substructure					161623		67.06	3.98
(a) Normal foundations		1520 m3	106.33	161623		67.06		
(b) Basement excavations		0 m3		0		.00		
(c) Special conditions		0 m2		0		.00		
2 Structure					289802		120.25	7.13
(a) Lowest floor construction		1520 m2	45.67	69420		28.80		
(b) Upper floor construction		822 m2	108.46	89155		36.99		
(c) Roof construction		1527 m2	85.94	131227		54.45		
3 Exterior Cladding					855569		355.01	21.06
(a) Roof finish		1527 m2	86.20	131623		54.62		
(b) Walls below ground floor		0 m2		0		.00		
(c) Walls above ground floor		1431 m2	263.16	376580		156.26		
(d) Windows		106 m2	2220.70	235394		97.67		
(e) Exterior doors & screens		17 No	3372.35	57330		23.79		
(f) Balconies & projections		77 m2	709.64	54642		22.67		
4 Interior Partitions					850215		352.79	20.93
(a) Permanent partitions		2554 m2	136.51	348645		144.67		
(b) Movable partitions								
(c) Doors		149 No	3366.24	501570		208.12		
5 Vertical Movement					40920		16.98	1.01
(a) Stairs		9 No	4546.67	40920		16.98		
(b) Elevators								
(c) Escalators								
6 Interior Finishes					311240		129.15	7.66
(a) Floor finishes		1992 m2	23.90	47606		19.75		
(b) Ceiling finishes		1894 m2	79.88	151291		62.78		
(c) Wall finishes		7385 m2	15.21	112343		46.62		
7 Fittings & Equipment					45690		18.96	1.12
(a) Fittings & fixtures		2410 m2	18.96	45690		18.96		
(b) Equipment		0 m2				.00		

Element	Ratio to GFA	Elemental Cost		Elemental Amount		Rate per SF/M ²		%
		Quantity	Unit Rate	Sub-total	Total	Sub	Total	
8 (a) Electrical					335400		139.17	8.26
(i) Service & distribution		2410 m2	21.45	51700		21.45		
(ii) Lighting & power		2410 m2	61.00	147000		61.00		
(iii) Systems		2410 m2	56.72	136700		56.72		
8 (b) Mechanical					778275		322.94	19.16
(i) Plumbing & drainage		2410 m2	118.40	285350		118.40		
(ii) Fire protection		2410 m2	24.93	60075		24.93		
(iii) HVAC		2410 m2	179.61	432850		179.61		
9 Overheads & Profit				0	393700		163.36	9.69
Net Building Cost					4062435		1685.66	100.00
10 Site Development					254755		105.71	
(a) General		2410 m2	53.53	129000		53.53		
(b) M & E site services		2410 m2	52.18	125755		52.18		
(c) Alterations								
(d) Demolition								
11 Contingencies								
(a) Design contingency								
(b) Escalation contingency								
(c) Construction contingency								
GROSS BUILDING COST					4317190		1791.36	
GROSS FLOOR AREA		2410 m2						
COST PER CELL UNIT = 80No ex site work			\$50,780.44					

E-4-A

Hanscomb

ELEMENTAL
COST SUMMARY
Part 2 of 2

TYPICAL CELL UNIT - COST ANALYSIS

FLOOR AREA: GROSS 9.5 m2

Item	Quant	Unit Amount	% of Total
Floor slab (on grade)		517	3
Exterior wall		630	3
Roof slab (or structural floor)		763	4
Interior wall		1,080	5
Window		2,924	14
Door		1,000	5
Mechanical space door		350	2
Hardware - general		95	
- security		4,538	22
Floor finish		146	1
Ceiling finish		53	
Wall finish		242	1
Sanitary accessories		340	2
Plumbing - fittings		1,400	7
- services		1,497	7
Fire protection		200	1
Heating		2,200	11
Ventilation		245	1
Lighting		100	
Power		330	2
Other systems		300	1
Contractors Indirects		1,696	8
		20,646	100
FOR COMPARISON WITH FUNCTIONAL AREA ANALYSIS - DEDUCT			
Shell Costs		1,910	
Fittings and Equipment		340	
Contractors Indirects		1,696	
		16,700	

PROGRAM BUDGET ANALYSIS

WARKWORTH S4 VE

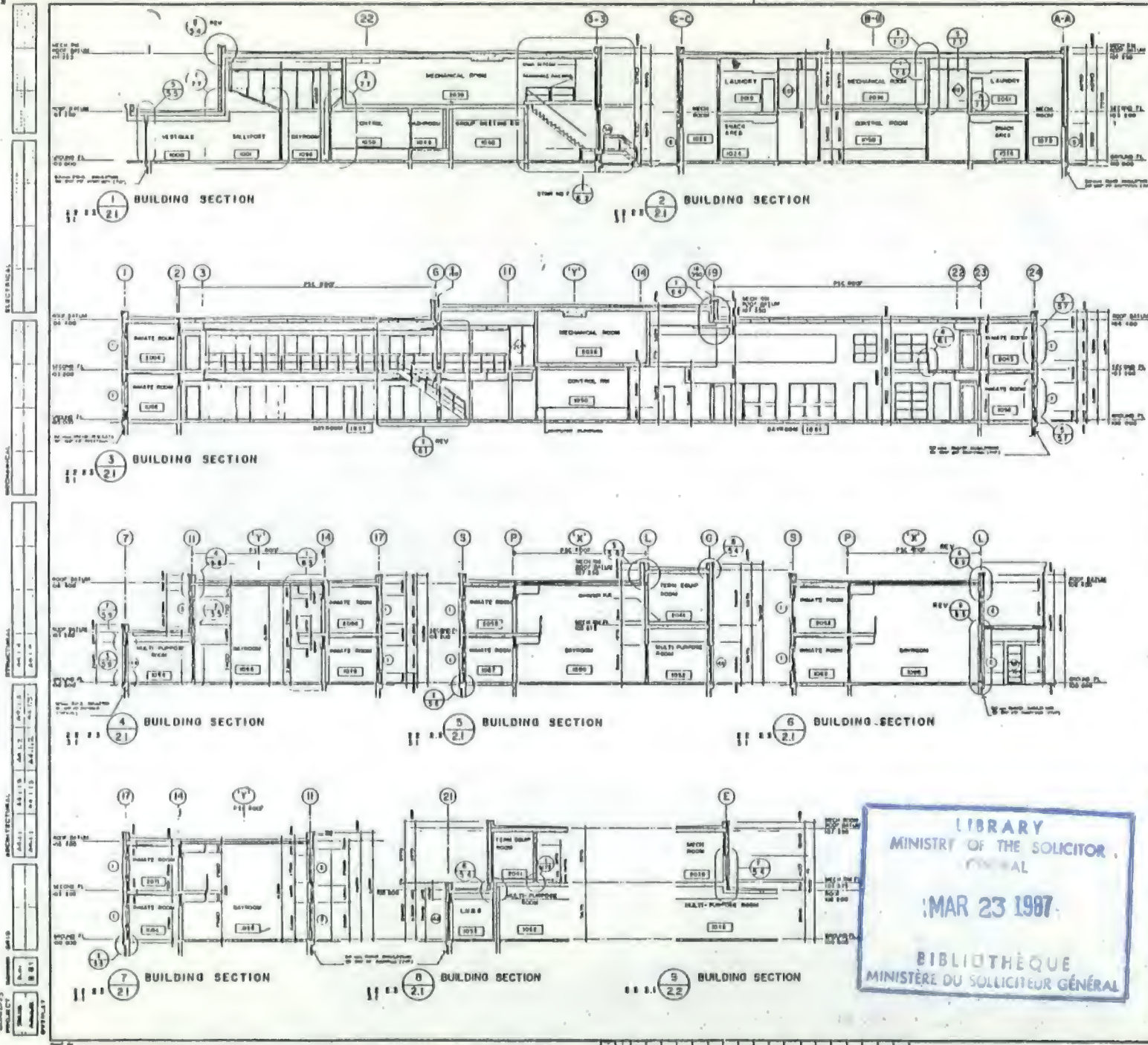
OCTOBER 1985

COMPONENT	NET		GROSS		UNIT RATES			TOTALS	
	FLOOR AREA	FLOOR AREA	SHELL \$M2	STRUCT \$M2	ARCH \$M2	MECH \$M2	ELEC \$M2	\$M2	\$
1. BASE BUILDING SHELL		2410	457.31			84.12	51.70	593.14	1,429,463.00
2. INTERIORS									
A) FUNCTIONAL AREAS									
a) Cells	600	770		13.50	1,076.75	575.79	76.80	1,742.84	1,341,986.30
b) Inmate amenities	130	150			681.91	87.27	100.67	869.85	130,477.00
c) Circ / recreation	950	1075			244.81	52.31	102.42	399.54	429,504.00
d) Staff amenities	16	20			510.75	311.65	100.65	923.05	18,461.00
e) Administration	80	92			1,208.26	255.10	112.62	1,575.98	144,990.00
f) L.U.D.O.	30	40			317.83	256.60	125.83	700.25	28,010.00
B) BLDG SUPPORT AREAS									
a) Circulation	0	0							
b) Toilets	0	0							
c) Janitorial / Storage	24	33			235.97	56.64	100.73	393.33	12,980.00
d) Mech & Elect	180	230			262.71	91.39	24.91	379.00	87,171.00
e) Bldg Construct	400	0							
3. FITTINGS AND EQUIPMENT		2410						18.96	45,690.00
4. OVERHEADS AND PROFIT								159.63	384,709.00
TOTAL									4,053,441.30

=====

APPENDIX B
PLANS, ELEVATIONS AND SECTIONS





GENERAL NOTES

1. ALL ROOMS ARE CONCRETE UNLESS NOTED AS A FLOOR FINISH

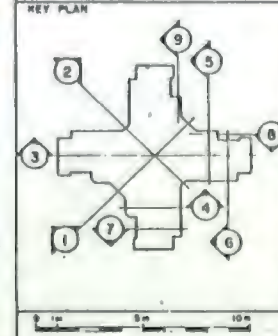
2. ELECTRICAL WORK CONSTRUCTION:
 - BRICK WALLS
 - FILTER FABRIC
 - 100MM FIBRE INSULATION
 - ALUMINUM BRACKET
 - ROOF DECK

LEGEND OF WALL TYPES

1. BRICK ROOMS BUILT IN TYPE CONCRETE BLOCK WALLS REINFORCED AND GROUTED

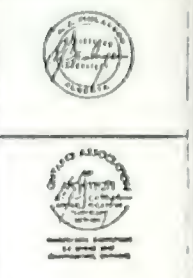
2. BRICK ROOMS BUILT IN TYPE CONCRETE BLOCK WALLS REINFORCED UNLESS NOTED OTHERWISE

3. CONCRETE WALLS FOR THICKNESS REFER TO PLAN



Raines Finlayson & Partners

Architects & Engineers & Project Managers
 100-101 Queen Street West, Toronto, Ontario M5H 2R2



MARKWORTH - DISTRICT CORRECTIONAL SERVICE CANADA MARKWORTH INSTITUTION

S4 LIVING UNIT WASTE INCINERATOR

BUILDING SECTIONS

1. J. J. MOFFAT

2. S. S. S.

3. S. S. S.

4. S. S. S.

5. S. S. S.

6. S. S. S.

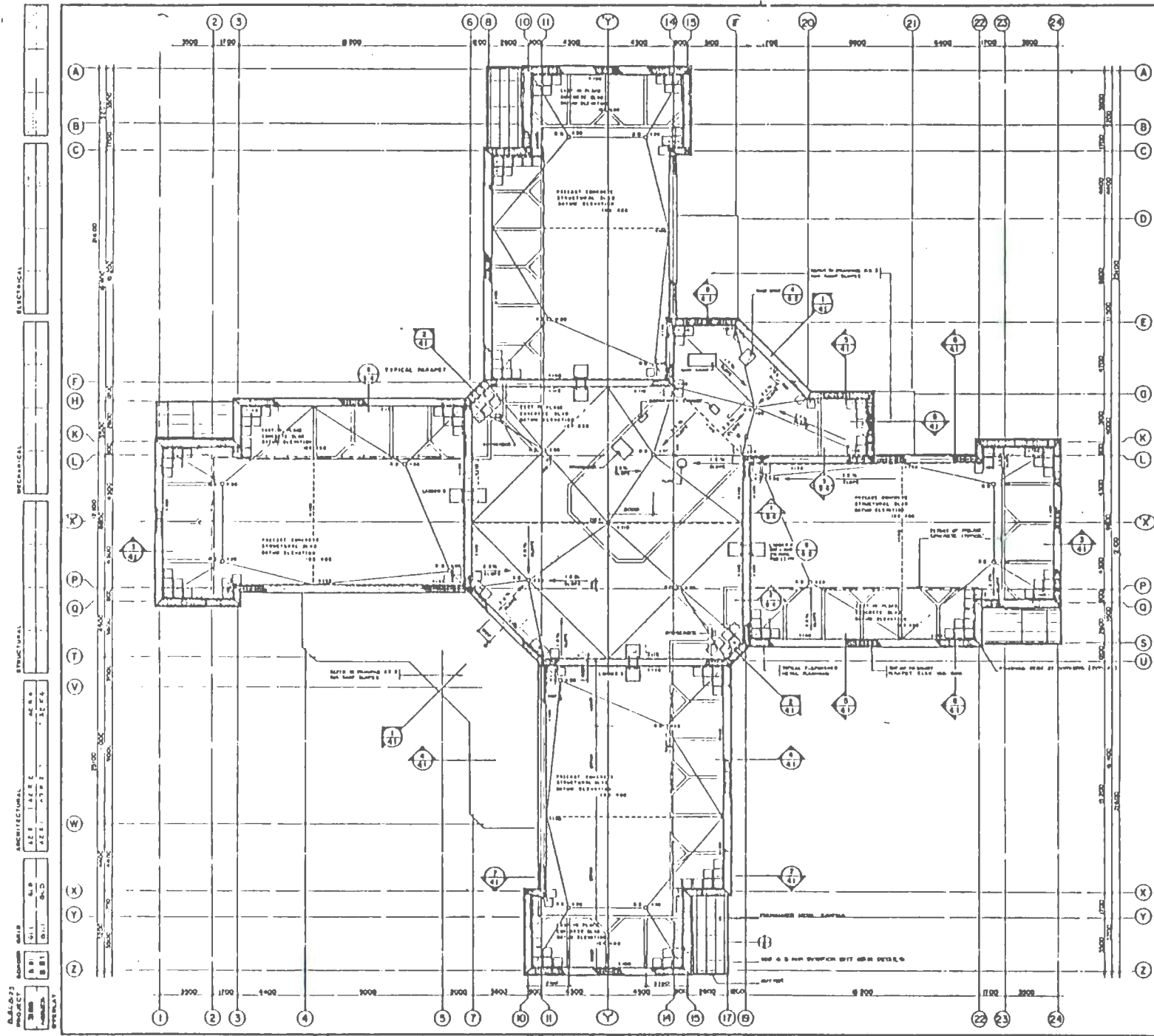
7. S. S. S.

8. S. S. S.

9. S. S. S.

103459-A

A4.1



LEGEND AND NOTES

- - - OVERFLOW SLOPPED
 - - - ROOF DRAIN
 - - - HIGH POINT OF ROOF
 - - - VALLEY
 - - - WALL BELOW ROOF
 - - - DEAD BELOW ROOF

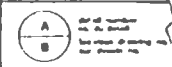
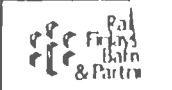
HIGH POINT OF CONCRETE TOPPING ABOVE
 ROOF BEFORE ELEVATION IS INDICATED BY
 A DIMENSION

ALL SLOPES ARE 2% UNLESS NOTED OTHERWISE

FOR LIGHTING FIXTURE LAYOUT REFER
 TO ELECTRICAL DRAWINGS

PRECAST CONCRETE PANELS

- TYPICAL DETAILS**
- 1-1 ELECTRICAL CONDUIT ROOF PENETRATION
 - 1-2 ROOF TOP MECHANICAL LINES PENETRATION
 - 1-3 MECHANICAL VERT FLOORING
 - 1-4 MECHANICAL DUCT CLAMP FLOORING

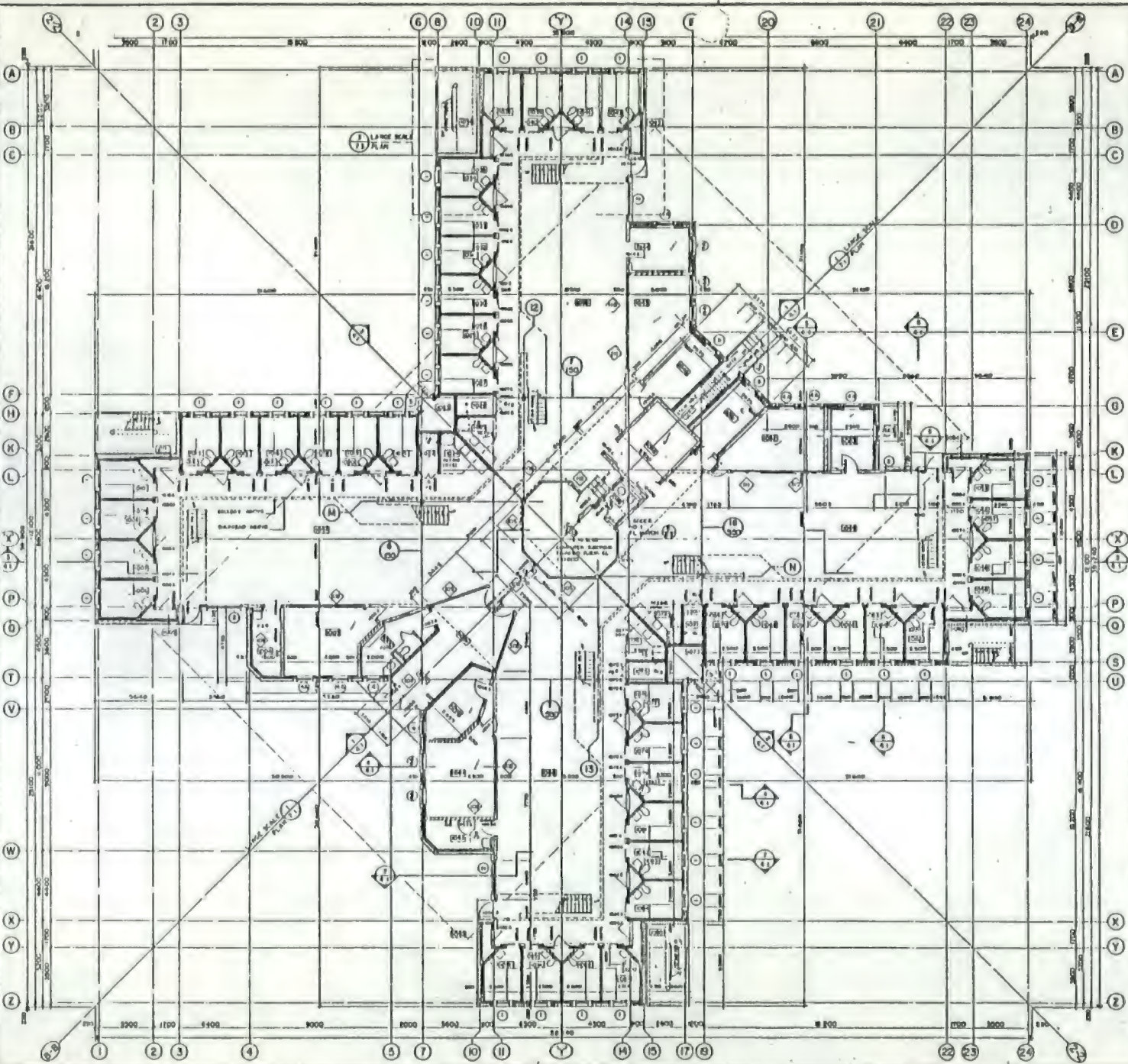


MARKWORTH CONSULTING ENGINEERS
 183459-A

S4 LYNOR UNIT LIMITED (INCORPORATED)
 ROOF PLAN

DATE	2.1.1987
BY	M.C.N.
CHECKED	
PROJECT	
183459-A	
A2.3	

DATE: 10/15/73	PROJECT: WARKWORTH	DESIGNER: RAINES FRAYSON BARNETT & PARTNERS
NO. 1	NO. 2	NO. 3
NO. 4	NO. 5	NO. 6
NO. 7	NO. 8	NO. 9
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Raines Frayson Barnett & Partners

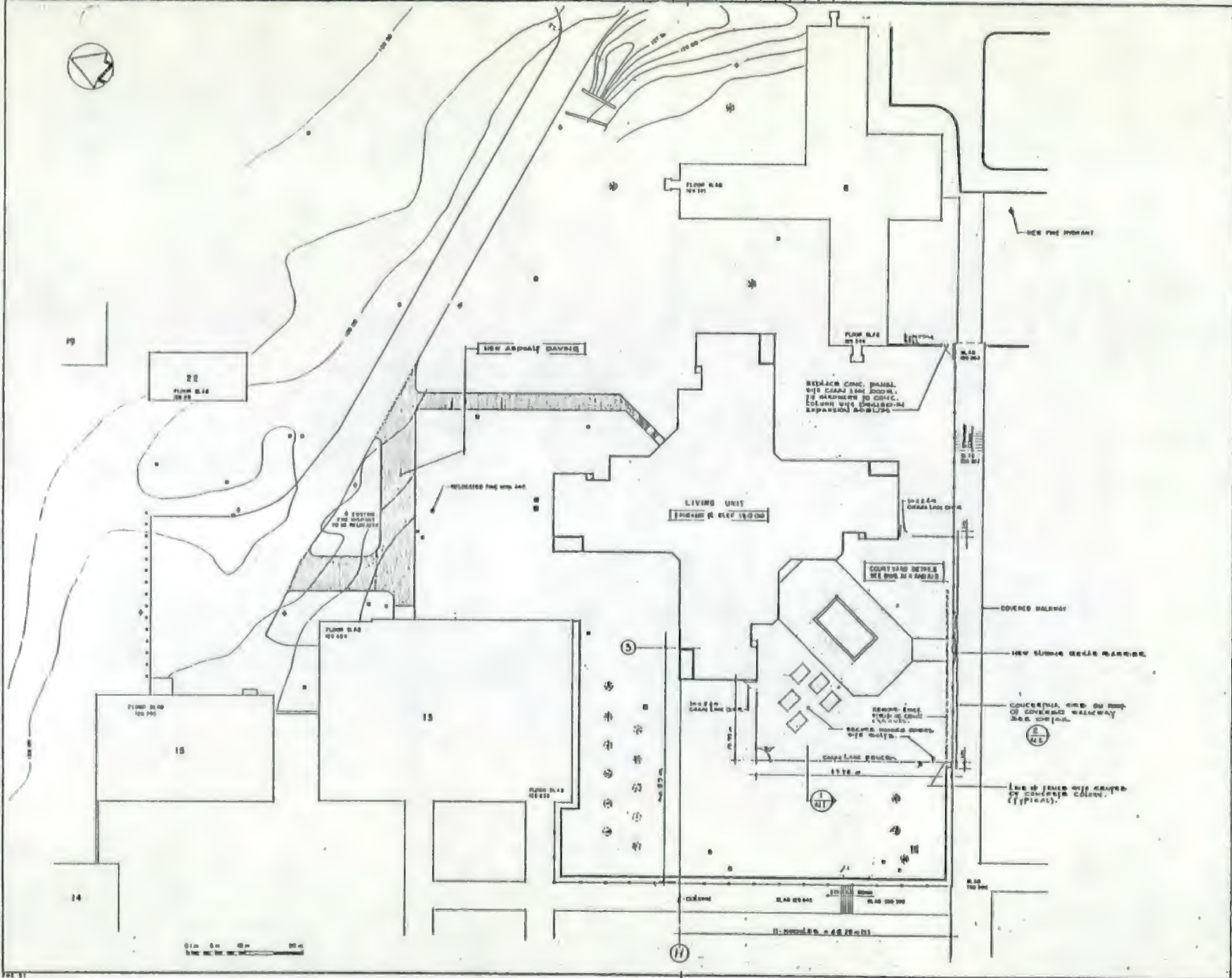
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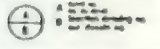
WARKWORTH - ENTERTAINMENT CENTER

CONCRETE CORRELATION STUDY FOR CANNON

GROUND FLOOR PLAN



Detail Notes
General
General
Detail Notes
Detail Notes



WARKWORTH
CORPORAL SERVICE CENTER
MILWAUKEE WISCONSIN

S-4 LIVING UNIT
SITE PLAN

P. AVARD
C.A.L.

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check -
ET - jobs
MC - jobs

S4 LIVING UNIT UNITE RESIDENTIELLE

OWNER
PROPRIETAIRE

Correctional Service Canada
Service correctionnel Canada

PROJECT MANAGER
ADMINISTRATEUR DE PROJET

Public Works Canada
Travaux publics Canada

Ontario Region
Région de l'Ontario

PROJECT NO.
NO. DU PROJET

183459 - A

ARCHITECT
ARCHITECTE

Raines Finlayson Barrett & Partners

STRUCTURAL ENGINEER
INGENIEUR STRUCTURE

Raines Finlayson Barrett & Partners

ELECTRICAL ENGINEER
INGENIEUR ELECTRIQUE

Raines Finlayson Barrett & Partners

MECHANICAL ENGINEER
INGENIEUR MECANIQUE

Vinto Engineering Ltd.

