Hornby Island Fire Department

Fire Hall
Planning Report

December 7, 2004

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Fire Hall Planning Report

INTRODUCTION

This report presents a summary of the information gathered by the Fire Department in response to an initial request by the Hornby Island Residents' and Ratepayers' Association (HIRRA) at the Executive meeting on October 7, 1999 (Attachment 1). The subject of the structural integrity of the existing fire hall arose from a concern over the ability to safely house the new pumper truck, which had been approved for purchase.

The Regional District of Comox-Strathcona (RDCS) Building Inspector was invited to conduct a preliminary inspection of the fire hall and prepare a letter outlining his comments. The Inspector visited the hall on December 9, 1999, accompanied by the Fire Chief, Giff La Rose and HIRRA Vice-president, Andrew Carmichael. The Inspector's comments, attached as Attachment 2, identified potential structural concerns due to the building materials and methods used over the years of hall additions.

BACKGROUND

The Fire Hall building was constructed in four phases using the volunteer labour of the Fire Department members, donated materials (for the early phases), community purchased materials and some paid labour:

- The initial building, constructed around 1968-69, consisted of the ground floor radio/meeting room of 265 ft^2 and 988 ft^2 for vehicle bays 1 and 2. Total floor area was 1,253 ft^2
- The second phase, around 1984, added the second floor office, meeting room, kitchen and shower, providing a total floor area of 2,506 ft^2
- Phase three in 1990, added 615 ft^2 with bay number 3, increasing the total floor are to 3,121ft^2
- Phase four in 1997 added 763 ft^2 with bay number 4, for a total area of 3,884 ft^2

A partial seismic upgrading of bays 1 and 2 was undertaken in 1992, using funds obtained through a grant from the lottery foundation.

The Fire Hall is a true community building, with countless volunteer hours having gone into the construction and maintenance over the years. Many Island residents have at one time been a member of the Department and taken part in the growth of the Hall to the present configuration.

- <u>1997 Fire Hall Planning</u>

A Planning Committee of interested Fire Fighters was formed in April of 1997 to investigate future development of the fire hall building and identify immediate needs. Their initial

brainstorming sessions explored ideas for possible 5 and 10 year projections for the Department and identified priorities for immediate action. (see Attachment 3)

The local design firm of Blue Sky Design was retained to work with the Committee in developing conceptual plans based on a 'wish list' formed in discussions with the Fire Fighters. (see Attachment 4).

Blue Sky Design produced a set of plans, complete with scale model, showing a series of construction and renovation works spaced over four stages. The completed project provided for an attractive building, satisfying the 'wish list' developed by the Committee. The plans included a construction cost estimate for the work, which totaled $220,903. (see Attachment 5). The plans were filed for future reference.

The plans, while impressive in conceptual design and functionality, unfortunately neglected the existing building construction faults and seismic considerations.

PROCESS

The Executive of HIRRA discussed the recommendations of the Building Inspector at their January 2000 meeting, and directed the Fire Chief to undertake further investigation of the building structure (see Attachment 6)

The Chief retained Ron McMurtrie, P.Eng. to conduct a preliminary investigation and analysis of the fire hall structure based on the 1998 Building Code for post disaster facilities. Mr. McMurtrie confirmed the Terms of Reference for the review in his letter of September 24, 2000 (see Attachment 7)

The report prepared by Ron McMurtrie & Associates, titled "**Preliminary Seismic Review Existing Firehall Building**", dated November 7, 2000, is attached as Attachment 8. The report identified numerous areas of concern in the building and concluded that the structure was unlikely to survive any moderate earthquake without severe structural damage.

The Executive of HIRRA, the Fire Committee and the Fire Chief met with Mr. McMurtrie in November 2000, to discuss the report and agreed to proceed with a more thorough evaluation and repair cost estimate. A proposal with the agreed Terms of Reference was received from Mr. McMurtrie on November 27 (see Attachment 9). Mr. McMurtrie was retained to undertake the investigation and prepare the repair cost estimate.

A report, titled "**Cost Analysis and Estimated Performance of Seismic Upgrading – Hornby Island Firehall Building**", dated May 2, 2001 was presented by Mr. McMurtrie and is attached as Attachment 10.

Copies of both reports prepared by Mr. McMurtrie were forwarded to the Regional District on May 16, 2001. (see Attachment 11)

The Executive of HIRRA, the Fire Committee, Fire Department officers and the Fire Chief met with Mr. McMurtrie on May 21, 2001 to discuss the contents of the Cost Analysis report. Various options were discussed and it was agreed that the Regional District should be consulted with respect to questions that arose in the meeting. (see Attachment 11)

The Fire Chief and Fire Department Officers met with the Executive of HIRRA, the Fire Committee, The RDCS Director and RDCS staff on June 28, 2001 (see Attachment 12) to discuss the results of the various reports and identify future actions. The meeting concluded that:

- There were three options open for future actions:
  1) Do nothing
  2) Repair the existing Fire Hall as per the McMurtrie report of May 2, 2001
  3) Build a new Fire Hall

  Any decision on a course of action would follow broad community consultation.

Following this meeting, two separate Committees were set up to investigate Option 3; the construction of a new Fire Hall. The committees were established as:

Building Committee: Al Cannon, Bob Jeglum, Giff La Rose, and Rob Zielinski
Land Committee: Giff La Rose, Lynn Nunley, Iain Palmer

The Terms of Reference for each committee were drafted and are attached as Appendix A and B, respectively.

COMMITTEE REPORTS

➢ Building Committee

The Committee started their process by reviewing the size of the existing fire hall and functions of each of the areas. The size and function categories were evaluated based on present conditions and future planning, with the building life expectancy estimated at an industry standard of 50 years.

The following areas were identified for inclusion in the design of a new hall:

- Truck bays 4 at 750sq.ft. each
- Radio room 70sq. ft.
- SCBA room 56sq. ft.
- Compressor rm. 56sq. ft.
- Maintenance rm. 200sq. ft.
- Gear room 250sq. ft.
- Foyer 150sq. ft.
- Storage 150sq. ft.
- Utility room 30sq. ft.
- Offices 165sq. ft.
- Training/records 200sq. ft.
- Kitchen 200sq. ft.
- Janitor 40sq. ft.
- General room 1,300sq. ft.
- Upstairs toilets 63sq. ft.
- Men's toilets 166sq. ft.
- Women's toilet 136sq.ft.
- Exercise room 220sq. ft.

The Committee undertook an informal study of typical fire hall designs and obtained copies of plans prepared for some other fire halls in British Columbia: Langford, Quadra Island and Lillooette. From these designs and the estimated floor areas, the Committee developed a preliminary concept of the building layout and size.

The next step in turning the preliminary concept into a visual representation was to retain the services of a designer or architect to bring all the pieces together. Bill Cannon was hired to prepare preliminary concept plans of the building, based on information provided by the Committee: sketches, briefing notes and floor areas.

Conceptual plans were developed for a building that would replace the current fire hall and allow for future modest expansion of the department. The Committee considered the question of constructing for to-days' use and allowing for future expansion. The general view was:

- the number and size of truck bays would house existing equipment for the foreseeable future and that should expansion be necessary, an additional bay area could easily be added.
- The office space and other designated use areas be designed for an anticipated maximum of 25 members which represented a comfortable department size for the Island over the next 25 years. Any major increases in population and land uses would require additional planning to review the delivery of emergency services.
- The general room in the upstairs portion was made sufficiently large to accommodate simultaneous training/use sessions.

The final conceptual design plans are attached as Appendix C.

The Committee worked with Allan Fletcher, who volunteered his time and expertise to assist in preparing a preliminary budget estimate for the building construction costs. Allan provided a cost estimate, attached as Appendix D, based on unit rates used for the new Courtenay Fire Hall.

The Building Committee canvassed other Fire Departments to obtain a range of building costs based on design differences, location and building type. Two other examples were found:

- Quadra Island Fire Department
  The basic building design for this new fire hall was used in the conceptual design for the proposed Hornby Island Fire Hall. The Quadra hall has a total floor area of 7,000 square feet and is of wood frame construction with vinyl siding. The building has been built to post disaster standards. The final cost for the site development and building is estimated at approximately $650,000. The Fire Chief, who is also a structural engineer, designed the building and acted as project manager. This and some volunteer labour kept the costs below what would normally have been expected.

- Oyster River Fire Department
  They are still in the planning stage, however they have been doing a lot of research into design and building costs. They started their process with a set budget of $1.1 million and retained a project management company to prepare conceptual designs and cost estimates within the targeted budget. After receiving conceptual plans which were not within their required budget, the Oyster River Committee has opted to continue with it's own research and has found a design which would satisfy their requirements and could be constructed within their budget. Their proposed building would be approximately 8,300 square feet in size.

→ The Building Committee investigated the cost benefit of selling the existing building to help with the cost of a proposed Fire Hall. A local realtor assisted by preparing an appraisal of the building and land. (see Appendix E)

The greatest value in the land and building might not be in recovering X amount of dollars, but in the value to the community as a multi-use community building. Many people in the community have volunteered countless hours in the building and maintenance of the Fire Hall and would appreciate if the property remained part of the community.

➢ Fire Hall Land Committee Report

The Committee reviewed the original Terms of Reference and added some additional parcels for consideration. It was agreed that the search for a possible new building site be limited to an area within one half a kilometer of the present building to meet the insurance requirement that the service area be within 8 kilometers (5 miles) of the Fire Hall. (see Appendix F)

The following Crown Land areas were identified for investigation in the search for a suitable site for a new Fire Hall:

1. Highway gravel pit area (across from the Recycling Depot)
2. 10 acre lease area on Solans Road which is currently leased by HIRRA
3. the area immediately east of the Cemetery
4. the area on the west side of the Recycling Depot road at Central Road
5. Lot 1, Plan 31933 (10 acre Crown Land parcel at Barney French Road)
6. unsurveyed parcel between JoeKing Ball park and the Community Hall)
7. the existing Fire Hall property
8. Light Industrial Area (parcel west of existing Fire Hall)

The Committee considered the size of the proposed building, training area and buffer requirements and determined that the new location would need approximately 2 to 2.5 acres, or 0.81 to 1 hectare. The Ministry of Health would normally require a minimum subdivided property to be 1 hectare.

A parcel ranking matrix was developed, based on suitability criteria, which allowed for comparison of the various parcels:

Criteria	Site #1	Site #2	Site #3	Site #4	Site #5	Site #6	Site #7	Site #8
Availability	0	4	3	3	3	3	3	3
Septic field suitability	4	4	3	1	1	4	0	3
Ease of access	4	2	4	2	0	4	3	2
Power service	4	4	4	4	4	4	4	4
Drainage	4	4	3	3	3	3	4	3
Property gradient	4	4	3	1	1	4	1	2
Disturbance of/by neighbours	4	2	3	4	4	2	3	4
Merchantable timber	2	2	3	1	1	2	0	1
Public visibility/access	1	1	4	3	2	4	4	1
Water source	3	3	3	3	3	3	3	3
Parcel area (1 hectare or more)	4	4	4	4	4	4	1	4
TOTALS	34	34	37	29	26	37	26	30

Ranking criteria based on: **0** – nil; **1** – poor; **2** – fair; **3** – good; **4** – excellent

General Site comments

Site #1: Highway gravel pit area

The Ministry of Transportation and Highways currently leases the parcel for their use and it may be difficult to remove a portion from this lease. It was generally felt that an area would not be available for use as a new fire hall site.
One other consideration was the potentially poor public visibility due to the downhill slope away from Central Road.

Site #2: 10 acre lease area on Solans Road

The most readily available site among the identified parcels, however the location was the least desirable. It was felt that the emergency access to Central Road, as the primary route for access to the majority of the Island, was seriously faulted due to the poor visibility at the intersection of Solans Road and Central Road.

Site #3: parcel immediately east of Cemetery

The front section appears wet due to poor drainage. This could be corrected and otherwise the parcel would provide a good site for a new Fire Hall. The site slopes gently toward Central Road. This site was considered an acceptable alternative to Site #6 as a preferred site.
There may be some concern from the neighbour to the east, at 4330 Central Road, however the separation distance would be a sufficient buffer for sight and sound.
The access to Central would be on the outside of the slight curve in the Road and still provides for safe sight distances.

Site #4: area to west side of Recycling Depot entrance

The ground slope is generally too steep to accommodate a Fire Hall and associated parking without blasting and excavating. It was also felt that it might prove difficult to locate a septic field in the area due to the shallow soil depths, although no actual test holes were excavated. The information from Site 8 was used as representative for the area.

Site #5: Crown Land parcel at Barney French Road

The slope of the property appeared to be too steep to easily accommodate the Fire Hall and the access, adjacent to Carmichael Road and the top of the blind hill, raised concerns with visibility and safety.

Site #6: parcel between Joe King Parka and the Community Hall

A site favoured by the Committee for its location, access and good level ground. It does have some issues with site drainage, which could be resolved with a bit of extra work. The location, adjacent to the Ball Park could pose a problem with respect to noise and smoke during training exercises conflicting with Ball Park activities.

Site #7: existing Fire Hall property

The Committee considered the use of the site in the event it was decided to construct a new Fire Hall on the property.
The slope on the property has been overcome to a degree, by blasting and excavating. It would be difficult to accommodate a larger building on the site due to the ground slope constraints and building setback requirements. The current setback does not meet the bylaw requirements.

The parcel is approximately half of the area required to adequately accommodate the building, parking and training facilities. The existing septic field is located at the Ball Park and the well water is supplied from the Highways yard.

Site #8: Light Industrial area adjacent to the existing Fire Hall

The steep slope up from Central Road would necessitate the building being constructed well back from the road, where the ground levels out. Access to Central would be awkward due to this slope. The one area approved for a septic field is located adjacent to the rear access to the existing Fire Hall.

o Liaison with Land and Water BC Inc.

The Committee sought the assistance of Don Marchand from the Regional District, to approach Land and Water BC (LWBC) regarding initial comments on the parcels mentioned in the Terms of Reference. The agent from LWBC responded January 8, 2002 (see Appendix G).

A letter and site sketch was sent to LWBC on May 31, 2002, soliciting additional comments with respect to Site #6 (Appendix H). The new agent for Hornby Island, Doug Berry responded on June 12, 2002 with many questions (Appendix I).

A meeting was held between Tony Law, Island Trustee and the Fire Chief, to discuss the issues raised in the response from LWBC. The Islands Trust then, in a letter to Mr. Berry on February 26, 2003 (see Appendix J), confirmed their intent to assist in the planning and community consultation process with the parties involved in the Fire Hall project.

A meeting was held in the Nanaimo office of LWBC with Bob Vanderzwaag (RDCS Administration Officer) and Gordon Smaill (LWBC Officer).

The discussions included:

1. disposition of the existing Fire Hall parcel
2. possible new Crown Land parcel

The general results of the meeting were:

1. The existing Fire Hall property is a grant to the RDCS with the proviso the land use continues for Fire Hall purposes. (Appendix K) The Title would revert to Crown should the use change and the building would have to be removed, or the property could be bought from LWBC at market price.
   Mr. Smaill indicated the willingness on the part of LWBC to consider changing the terms of the Grant, still to be held by the RDCS, if the building were to be used for community activities.

2. Mr. Smaill reviewed the findings of the Committee and offered comments on the various parcels. Mr. Smaill agreed that the two parcels identified as preferred (Site #3 and #6) were potentially acceptable, however both had considerations affecting their use. In the case of Site #3, the area is in the Groundwater Recharge Area noted by Water, Air and Land Protection. Site #6 has possible issues with proximity to the Ball Park.
   Mr. Smaill suggested consideration be given to Site #1 and offered to assist Bob Vanderzwaag in contacting the Ministry of Transportation official responsible for the site. It was agreed that the Fire Department Land Committee re-examine the site and identify a potential area for discussion with the Ministry.

The Land Committee met on March 16, 2004 and walked the Central Road frontage of Parcel #1 to look for a potential location. A promising site was located on the immediate west side of the existing entrance into the gravel pit. This area provided the minimum slope down from Central Road and relatively gentle slope in the building area.

❖ Site Layout

A site plan was prepared for Site #1 (see Appendix L)

The layout included the building, oriented with truck bays parallel to the road, asphalt driveways, concrete aprons, gravel training area and possible septic field area.

Site Development Costs

Preliminary costs were estimated for the basic services associated with the site. It is understood that the costs could vary for different sites and these represent general costs for Site #1.

• Paved driveways and aprons (using local pit run)	$80,000
• Drainage	$ 8,000
• 400 Amp Hydro service	$ 750
• Telephone	n/c
• Well and water system	$ 7,000
• Gravel training area	$ 6,000
• Septic system	$25,000
• Clearing	$ 5,000
TOTAL	**$131,750**

NEW FACILITY COSTS

The construction costs for a new building as shown on the attached conceptual plans, including site development and servicing would be capped at a maximum of $1 million.

The final design plans, with finishing details, would be adjusted to fit within or below the budget cap. This adjustment may involve some volunteer work for specific portions of the construction and management of the project.

The Regional District would borrow the funds for the cost of the new fire hall through the Municipal Finance Authority. The likely amortization period of 20 years would result in an annual cost of approximately $85,743 being added to the Fire Department annual budget. (Appendix M). The Equivalent Residential Rate would increase by $0.4059/$1,000 of assessed value. ($40.59 per $100,000 of assessed value)

Bylaw No. 2011, being the Hornby Island Fire Protection Local Service Establishment bylaw, currently fixes the maximum requisition as the greater of $168,935.00 per year or $1.00 per $1,000 of assessment (Appendix N).

The proposed 2005 Fire Department budget is:

- $134,333 for Operations
- $0 for Capital
- $ 69,160 for RDCS functions and Vehicle Capital
- $203,493 Total Budget

(see Appendix O)

The 2005 Budget represents a Levy of $1.00/$1,000 based on the current Authenticated Net Taxable Value.

The suggested Levy of $1.50 required to accommodate the cost of a new Fire Hall and maintenance of the current budget program, would necessitate a referendum question being approved by the community.

SUMMARY

The intent of this report has been to present information to the community regarding the status of the existing fire hall building and options for it's repair or replacement.

Recalling the initial three possible options:

1. do nothing – maintain status quo
2. upgrade the current Fire Hall to Building Code standards
3. construct a new Fire Hall

Added after review of the initial three options was:

4. keep existing Fire Hall but construct new truck bays as a separate building

Option 1: do nothing

If nothing is done to the existing building, the following points should be considered:

i. the building remains susceptible to major damage or failure due to seismic activity;
   - potentially crippling emergency response
   - current vehicle and equipment value is ±$800,000

ii. the building will require additional renovation and addition of space to meet existing and future needs;
   - estimated at $220,000 in 1997 (built onto existing weak structure –not allowed by Building Code)

iii. training facilities will be constructed uphill from the fire hall, requiring additional land area and tree removal;
   - estimated at ±$15,000

iv. the gravel yard and aprons will require paving in the future
   - estimated at ±$80,000

Option 2: upgrade the current Fire Hall to Building Code standards

The report completed by Ron McMurtrie & Associates (Attachment 10) reports on the probable work required to upgrade the existing building to near Building Code compliance. The cost estimate provided by Mr. McMurtrie, is an approximation of the cost anticipated for the probable work. Truck bays 3 and 4 would be demolished and a new building built separately from the rest of the structure.

Renovation of the existing building would require major disruption to the normal functioning of the Fire Department, for the duration of the work, requiring temporary relocation of vehicles, equipment and radio communications.

The future expansion of the fire hall, to meet the needs originally identified by the 1997 Planning Committee and by the more recent Building Committee, would still have to be addressed. The costs associated with the addition of building space, improved facilities and driveway/yard paving, would have to be added to the estimated upgrade costs.

The Structural Consultant, in his report (Attachment 10) asked: "Will the upgrading of the existing building and reconstruction of Bays #3 and #4 result in a facility that meets the needs of the Island and its residents well into the future?"

Option 3: construct a new Fire Hall

The Building and Land Committees have presented the results of their investigations into the desirable building size and possible location, to suit the requirements for the foreseeable future.

The construction of a new building at a new location would:

i. have a fixed maximum budget of $1 million;
ii. result in a tax increase of $0.40/$1,000 assessed value;
iii. provide adequate building space for the foreseeable future;
iv. provide improved training facilities for the foreseeable future;
v. make the old fire hall available for community use.

Option 4: construct new building for the trucks and keep the existing Fire Hall

This option was added after review of the preliminary report as a possibility that should be considered.

There are two primary positive points:

i. the cost is less than a new fire hall
ii. the trucks would be safe

Also to be considered are:

i. radio communications centre in the existing building is not protected
ii. this would require land acquisition for the truck building
iii. provides for very awkward operating procedures (personal and equipment)
iv. not great for member morale and recruitment
v. additional training area would still be required
vi. does not provide for any possibility of having a manned hall in the future
vii. the old building requires more maintenance

FIRE FIGHTER RECOMMENDATION

The members of the Fire Department reviewed the preliminary report and discussed the various aspects of the different options. The preferred option was the construction of a new Fire Hall. It was felt that the facility would better serve the Island over the next 25 to 50 years than any of the other options.

The least favoured option was Option 4

The following sheet provides a comparison of the four options.

Option	Positive Points	
1 Do nothing Maintain status quo	• Lowest cost	
2 Upgrade existing Fire Hall	• Less expensive than building a new Hall • The wiring and plumbing would be brought up to code	
3 Build a new Fire Hall	• The Hall would meet the needs of the Department for the foreseeable future • Improved training facilities • Improve recruitment • Reduce current maintenance spending • Improve Department efficiency/training • The Fire Fighters are safe! • Provide a smooth transition in services in the change from the old Hall.	• Provide the Community with the old Fire Hall for use as a multi-function building or if the building is sold, reduce the total cost by approximately $150,000 • Post disaster facility with emergency power providing the Community with communications for the Island and to the outside world as well as an emergency reception centre and shelter with kitchen facilities.
4 Keep existing Hall And build new truck bays as a separate building	• Less expensive than building a new Hall • The trucks would be safe in an earthquake	

Negative Points		Estimated Costs
• Building is not protected against earthquake • Emergency equipment is not protected and may be destroyed or damaged during an earthquake • Radio communications centre would be destroyed during an earthquake • Additional building expansion for current and future needs would be built on substandard building (not allowed by Building Code) • Existing building does not meet electrical, building or fire code requirements	• Additional training area would require acquisition of Crown land • The Fire Fighters are not safe • No option for future manned Fire Hall • Cost estimate does not include continuing maintenance **Option 1**	On-going maintenance of the building. Cost of new construction and renovation as per Blue Sky estimate in 1997 $220,903 Estimate for paving yards: $80,000 Training area work: $15,000 ESTIMATE: $315,903 Estimated Yearly Cost per $1,000 assessed value: ±$0.13
• Major disruption to the Fire Department during the renovations. Alternate space would have to be found for the equipment, vehicles, and operations including communications base • The building would be close to code but not meet code • Renovations are notorious for hidden costs and the estimate may be overly optimistic. The required work would see the demolition of 2 truck bays and gutting of the entire building.	• Truck bays 3 and 4 would have to be demolished and new bays constructed as a separate building. Any 2nd storey addition would also have to be as a separate building. • The cost estimate was approximate and was done in 2001 • Additional training area would require acquisition of Crown land **Option 2**	2001 estimate of seismic upgrading as prepared by McMurtrie: $184,000 Cost of new construction and renovation as per Blue Sky estimate in 1997: $220,903 Estimate for paving yards: $80,000 Training area work: $15,000 ESTIMATE: $500,000 Estimated Yearly Cost per $1,000 assessed value: ±$0.20
• The most expensive of the options	**Option 3**	Maximum budget of $1,000,000 Estimated Yearly Cost per $1,000 assessed value: ±$0.40 ($40 per $100,000 assessed value)
• The option rejected by the Fire Fighters • Radio communications centre would be destroyed during an earthquake as would some of the firefighter gear • Very poor for Department recruitment and morale • The new building would require land acquisition; likely the closure of the road between the Fire Hall and the Highways yard • Additional training area would require acquisition of Crown land • Makes for awkward operations having gear and equipment in such different areas.	• No option for manned Fire Hall • The Fire Fighters are not safe • Cost estimate does not include continuing maintenance of old building **Option 4**	Estimate for a 3,000 sq.ft. building at $100/sq.ft.: $300,000 Estimate for paving yard: $80,000 Training area work: $10,000 Renovations to existing building downstairs: 2,340 sq.ft. at $30/sq.ft. = $70,080 On-going maintenance ESTIMATE: $460,080 Estimated Yearly Cost per $1,000 assessed value: ±$0.18

ATTACHMENTS

Hornby Island Residents' & Ratepayers' Association
Executive Committee
Minutes of Regular Meeting, October 7, 1999
At the Hornby/Denman Community Health Care Society Building

Present: Judith Lawrence, President; Andrew Carmichael, Vice President; Sheila McDonnell, Treasurer; Janet LeBlancq, Administrator and Lynn Nunley, Chair, Fire Protection/First Responders' Program.

Call to Order: The meeting was called to order at 3 P.M.

Minutes: The minutes of the September meeting were approved as circulated. (It was noted that, due to a date change Sheila was unable to attend the Fire Department's meeting; Andrew Carmichael represented the executive at this meeting.)

Special presentation by Lynn Nunley, Chair, Fire Protection/1st Responders' Service:

Y2K Budget: The budget document was previously circulated to members of the executive. Lynn presented the budget and documentation outlining the proposal for the purchase of a new fire truck and refurbishing the old truck to serve as a rescue vehicle. There was discussion re the earth quake preparedness of the fire hall and truck bays. The $7000 budgeted is for structural reinforcement work. Lynn to take the executive committee's concern re earthquake preparedness to the committee for discussion. The need for an assessment by a structural engineer was discussed. It was noted that the HIRRA costs of administration and bookkeeping are due to increase in the Y2K budget – the amount of the increase will be communicated to the chief for inclusion in the budget. The executive approved the budget in principle including the acquisitions of a new truck, an auto extrication device and increase in the fire patrol wage costs. Lynn Nunley was excused from the meeting.

Business Arising:

a) Clinic Rental Agreement: Sheila has a draft agreement for signature by Joy Smith – Judith will then sign on behalf of HIRRA.
b) Emergency Preparedness Program: Janet attended the Comox Valley Emergency Preparedness Program regular meeting earlier today. Locally, a NEPP coordinating group, Judith, Suzanne and Janet have designed a mailout to enlist volunteers for the NEPP program. We have a program guideline from CVEPP and they will assist us with education sessions as required. **Andrew and Janet will attend the November CVEPP meeting in Courtenay.**
c) Additional Services funding- no word yet on our request for these funds. Suggested that we ask CSRD for their budgets for recreation and economic development.
d) The issue of relocating the Grassy Point bench to one of the sites recommended by Andrew and Bill Yeomans will be followed up at a later date. The donor of the bench, John Phipps, is currently mourning the death of his father and discussions about the bench in memory of his wife are deemed to be inappropriate at this time.
e) Policy for managing discretionary funds: 1st draft approved as presented.

REGIONAL DISTRICT

Comox-Strathcona

December 15, 1999 **Our File No.: 08603.010**

Hornby Island Fire Department
3850 Central Road
Hornby Island, BC
V0R 1Z0

Attention: Giff LaRose, Fire Chief

Dear Giff:

Re: Hornby Island Fire Hall
Preliminary Seismic Evaluation Report
Block C, Section 11, Nanaimo Land District
3850 Central Road **Electoral Area "K"**

PURPOSE

This letter will confirm the findings of the site inspection carried out by Giff LaRose, Fire Chief, Andrew Carmicheal, Hornby Island Resident's and Ratepayer,s Association and J. Claude Bédard, Chief Building Official on December 9, 1999. The purpose of the inspection was to provide a structural evaluation of the existing Fire Hall principally concerning the seismic requirements of the BC Building Code (the "Code").

FINDINGS

The Fire Hall is a 2 storey building with 3 parking bays and dispatch office on the 1st storey. The 2nd storey is used as a meeting and recreation area complete with a small kitchen and an office. There are no plans available therefore we must rely on anecdotal information. The building dimensions and size were not established. The building uses are Group A-2 Assembly, Group D Business and Personal Services and Group F-2 Medium Hazard Industrial. We did not substantiate the materiality of any fire separations or fire resistance ratings between the major occupancies. The interior stairway does not conform to Section 3.4. "Exits" of the Code. There are no exits off the 2nd floor. The building is also deficient plumbing facilities. The meeting and recreation room is approximately 70 m^2 (750 ft^2) in floor area. The occupant load for this space with non-fixed seats is 93 persons. The building is not accessible to persons with disabilities.

We did not examine the soils on which the building is supported. Due to the interior finish we were unable to verify the size, spacing and span of any dimensional lumber or determine their structural adequacy except as may be otherwise noted in this report.

R.R.#4, 4795 HEADQUARTERS ROAD, COURTENAY, B.C. V9N 7J3
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The original building was constructed of concrete block and heavy timber posts and beams, 1st storey and wood frame walls and site built truss roof, 2nd storey. We did not verify the existence of any pad footings, concrete piers, perimeter footings or foundations. Mechanical connectors and plywood gussets were recently added to strengthen post/beam connections. The slab and mechanical connectors anchor the base of the posts. Seismic protection for the concrete block walls consists of 2 X 4 frame walls complete with intermediate blocking and sheathed with $^3/_8$" plywood nailed at 3" on centre. These walls serve the dual purpose, to carry the roof and floor loads in the event that the concrete block wall failure and to prevent the blocks from collapsing inward thereby impeding the removal of the emergency vehicles. We could not determine how the floor above is anchored to these walls.

The 1st addition was constructed of concrete block walls, wood frame pony walls and roof. We were unable to verify the existence of perimeter footings or foundations. We were informed that the block walls were constructed with columns complete with rebar and concrete core at an undetermined spacing. There is no evidence for the existence of any bond beams. We could not determine if the addition was anchored to the foundations. The flat roof constructed of 2 X 8's at 24" on centre is over spanned for design live loads, rain, snow and occupants. Snow should not be allowed to accumulate during a prolonged snowfall or immediately after. Water ponding at the midpoint of the roof aggravates an already under designed roof structure. A roof drain is required at the low point to reduce the unnecessary rain load. The torch on roofing membrane is not suitable for use as a walking surface. You should refrain from using the roof as a deck until the roof structure is upgraded, an acceptable walking surface is installed and the area is protected with guards and exit facilities.

The 2nd addition was constructed of concrete block walls, wood frame pony walls and roof. We were unable to verify the size of the perimeter footings or foundations. We could not determine if the addition was anchored to the foundations. We were informed that the block walls were constructed with columns complete with rebar and concrete core at an undetermined spacing. There is no evidence for the existence of any bond beams. Lateral loads on the block foundation walls likely exceed design parameters. The exterior finish is wood siding. The flat roof constructed of 2 X 10's at 12" on centre. The torch on roofing membrane is not suitable for use as a walking surface. Use of the roof as a deck should cease until an acceptable walking surface is installed and the area is protected with guards and exit facilities.

CONCLUSIONS

Generally wood frame buildings constructed with substantial compliance to the Code and good engineering practices may be expected to perform well during a seismic event.

Concrete block buildings are more rigid and may be expected to suffer some damage the extent of which is dependent on the severity of the seismic event. Our findings indicate that the building fails to meet the structural design requirements of the Code including those for seismic loads.

The building is likely to be damaged in a seismic event due to:

- soils with inadequate bearing capabilities;
- insufficient load distribution building to ground;
- incomplete footings and foundations;
- lack of or insufficient anchors building to foundations;
- lack of mechanical connectors;
- inadequate design;
- faulty framing practices; or
- poor engineering practices.

RECOMMENDATION

The Building Official recommends that Hornby Island Fire Department:

- commission a registered professional, with experience in structural and geotechnical engineering, to conduct a thoroughgoing assessment of the building;
- prepare a budget for any upgrades required under the registered professional's report or for Code compliance;
- verify the completeness of required fire separations and fire resistance rated assemblies;
- provide exits from the 2nd floor;
- provide washroom facilities for persons of each sex;
- install a walking surface on the roof/deck;
- protect the roof/deck with guards;
- provide exits from the roof/deck;
- install a roof drain at the low point in the roof; and
- create a snow removal policy.

Sincerely,

J. Claude Bédard, RBO
Manager, Building Inspection

cc Roxanna Mandryk, Director, Electoral Area K
Janet LeBlancq, Administrator, Hornby Island Resident's and Ratepayer's Association
Harry Harker, General Manager, Development Services
Jean Ennis, Manager of Human Resources
John France, Risk Manager

FireHall Planning Committee

Question #1

Where will the Hornby Island Fire Department be in Ten years?

Thoughts:

- ⇒ some paid positions
- ⇒ full time office space for:
  - Chief
  - Secretary
  - Training Officer
  - First Responder Officer
  - Fire Prevention Officer
- ⇒ population growth?
- ⇒ 30 member department? + auxiliary?
- ⇒ more professional training
- ⇒ Fire/ Rescue Boat?
- ⇒ 5 vehicles (+ Mobile Command?)
- ⇒ over $200,000 Budget
- ⇒ increased public awareness/ interaction
  - first aid community training
  - fire prevention training

Question #2

How could the premises meet the needs of the above?

Thoughts:

- ⇒ at least 2 large offices, w/ 2 desks in each + filing cabinets
- ⇒ expanded computer system
  - terminals in Radio Room, Training Room
- ⇒ full Training Room
  - full multimedia system
  - complete resource library
- ⇒ full two floors on building
- ⇒ possible fifth bay
- ⇒ Parking lot
  - landscaping/ blasting
  - paving
  - ditching
- ⇒ power upgrade
- ⇒ complete phone overhaul
- ⇒ downstairs bathrooms
- ⇒ workout room
- ⇒ laundry facility
- ⇒ equipment increases

FireHall Planning Committee

Question #3

How do we plan to meet these needs

- financially
- realistically?

1) Prioritize needs
2) Establish current situation and how it fills needs
3) Do background research
    - WCB
    - our Department
    - other departments
    - Hornby community
    - Regional District
4) Cost / Benefit analysis
5) Gather community input
6) Break jobs into Project segments
    - worst case scenarios

Priorities

- drying room / turnout gear space
- equipment upgrade
    - ⇒ hoses
    - ⇒ turnout gear
    - ⇒ pagers
    - ⇒ Big Mama
- drainage / parking access
- interior door to #4 bay
- bike rack / storage
- heating system
- laundry facility
- P.A. system in bays / pageout speaker upstairs
- #1 & 2 bay floors
- sprinkler system

September 19th 1997

Michael MacNamara

Wish list for upstairs at Hornby Fire Hall.

Training room:

- to accommodate up to 40 persons seated.
- one end wall with a 10' X 10' screen for overhead and slides
- multi media training facility (TV & VCR, Flipcharts, overheads)
- high ceiling ; possible skylights; roomy and good acoustics
- training library shelves -(4) ea 12' long X 14" deep X 16" high (for binders)
- access to some kitchen and toilet facility

Office Space:

- maybe 3 smaller single desk offices, or
- 2 larger offices with 2 desks each (Chief, Training Officer, Fire Prevention Officer, and secretary desk, all with accessible computer area)
- good natural lighting and ventilation
- 3 legal size filing cabinets- one for each officer

Study room:

- small quiet, relaxed study room for one or two people to sit and read or think
- large enough to have a small table and 3 or 4 board room chairs

Smoker's area:

- possible deck area, transparent roof, or somehow sheltered, to sit outside
- could be part of office or training room area

Sleeping Quarters:

- maybe to accommodate 2 cots or Murphy beds -
- this to offer to instructors or business reps invited to island.
- only needs a night table or two and beds and clothes storage

Office Area for Ratepayers:

- this needs a private entrance and access to main hall
- size and planning unknown, could be phone, computer, and filing freindly.

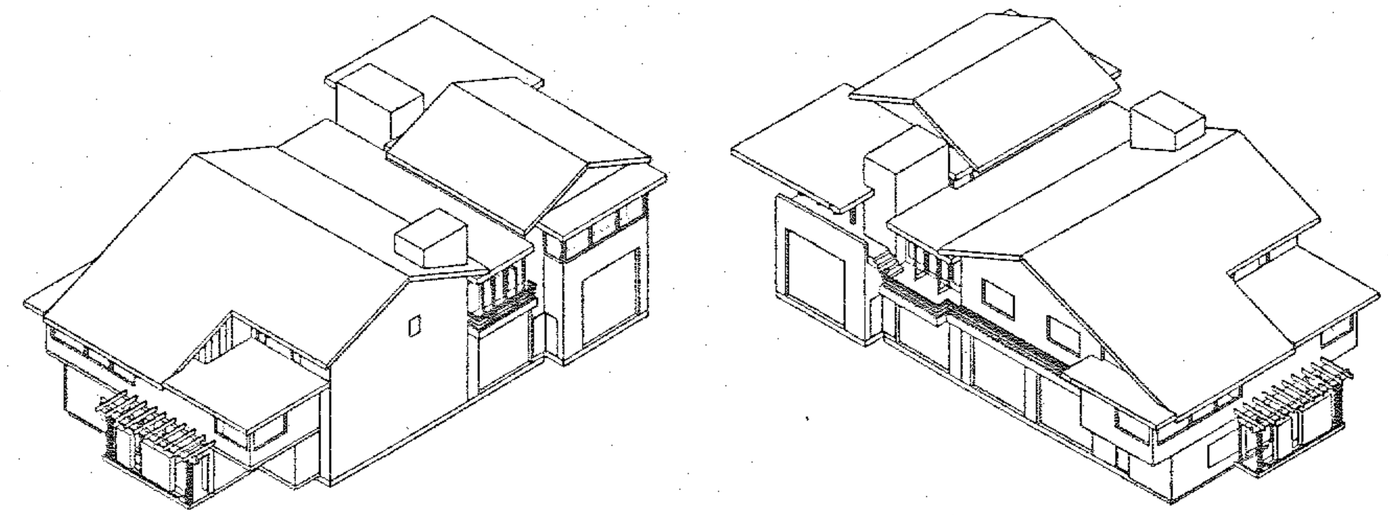
Roof Training Area:

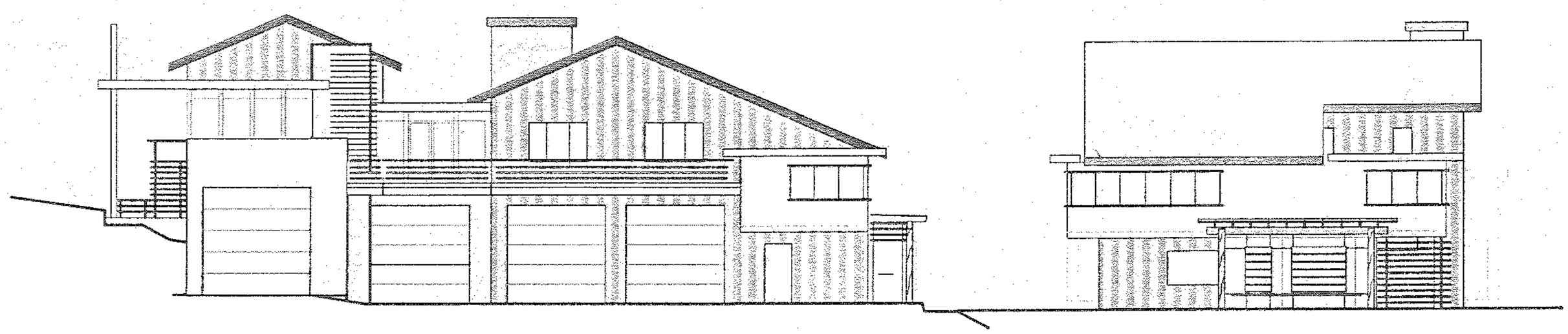
- accessible from current tower and durable to high traffic
- could be same height and adjacent to current tower, walls free of roof overhangs, and some designed edge protection for ropes

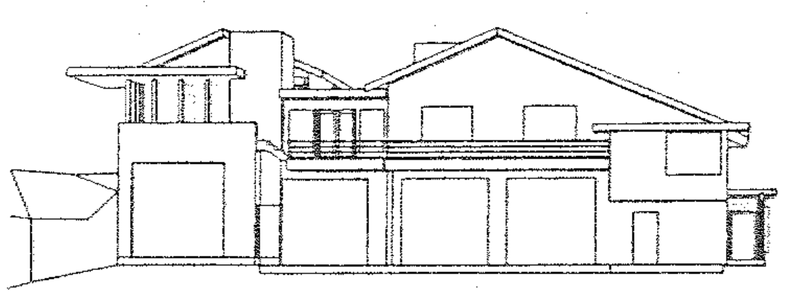
Hornby Island Fire Hall

Nov/Dec 1997

BLUE SKY DESIGN
HORNBY ISLAND





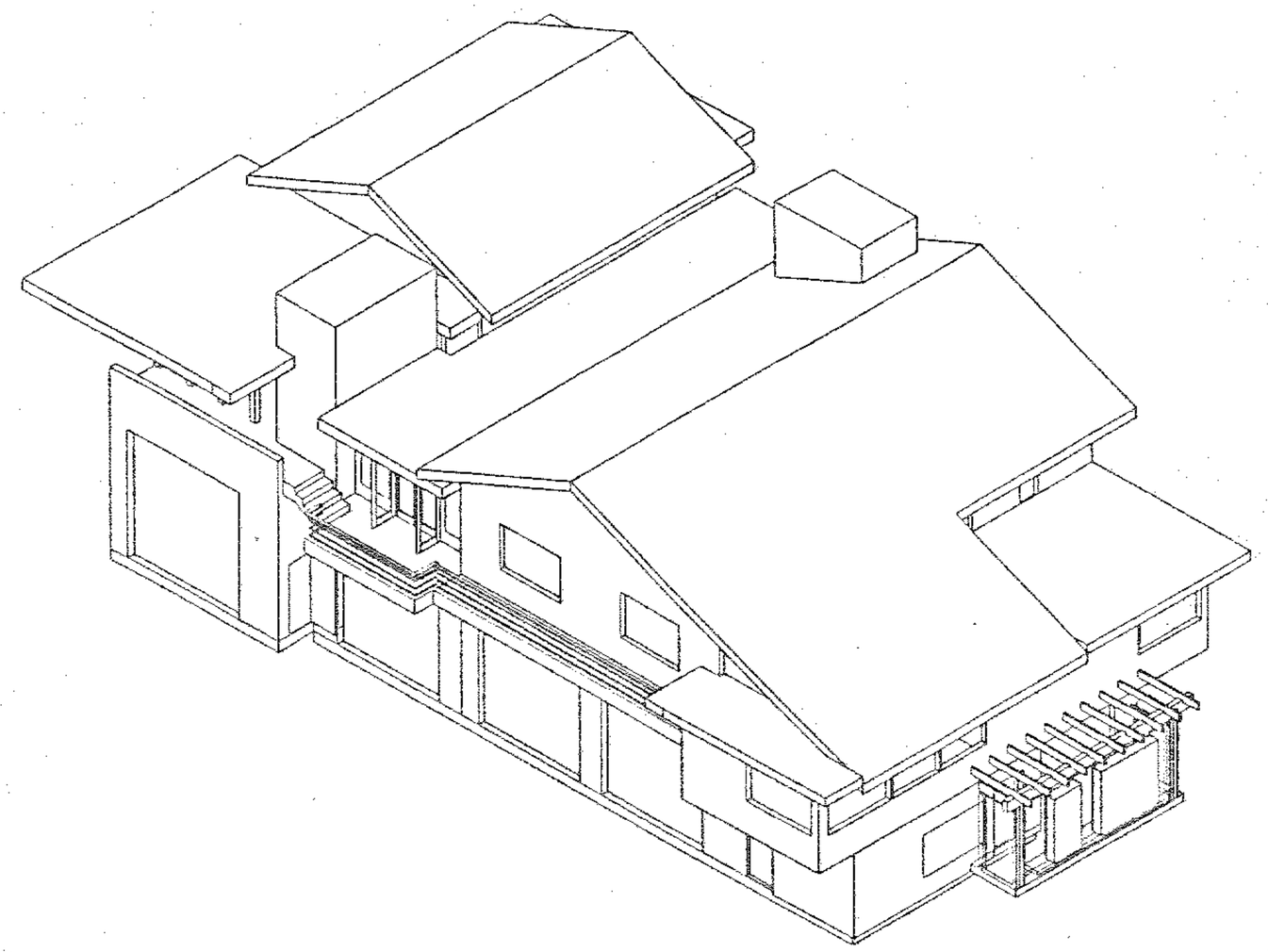


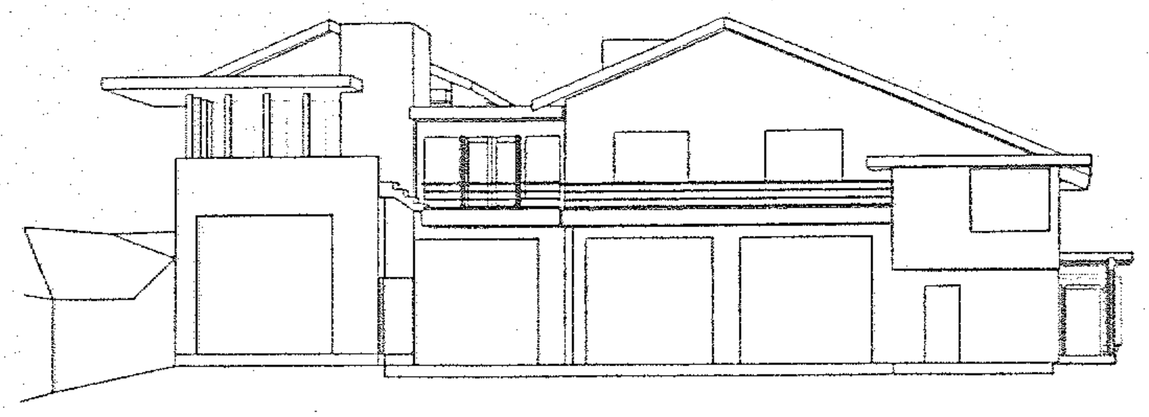
Proposed new Elevations, isometrics 1/16" = 1'

Hornby Island Fire Hall Nov/Dec 1997

BLUE SKY DESIGN
HORNBY ISLAND

TEL 335-0115 FAX 335-0895





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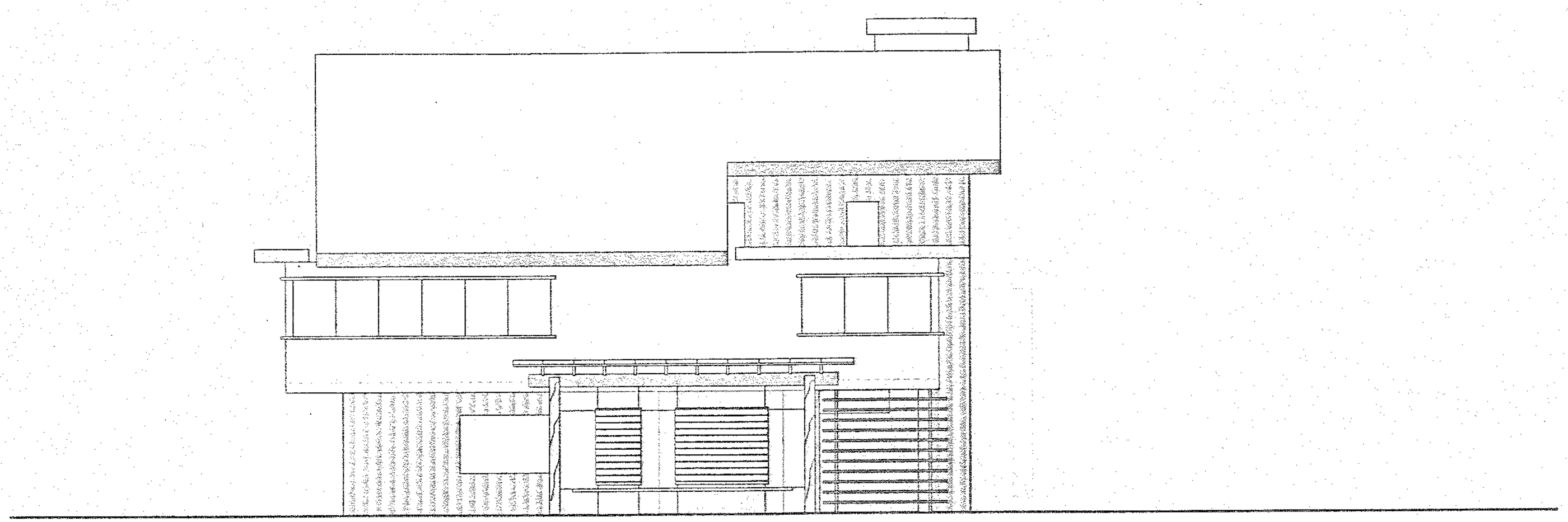
TEL 335-0116 FAX 335-0485

Possible "Front" (South-East) Perspective, Possible East Isometric

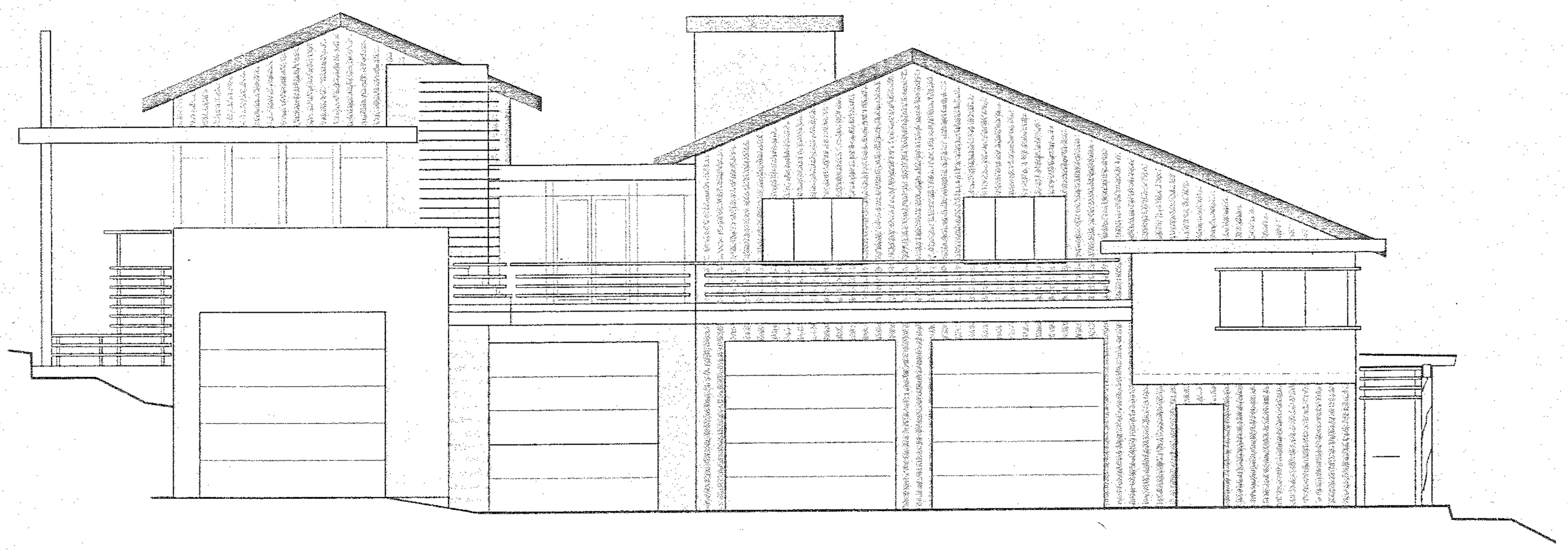
Hornby Island Fire Hall Nov/Dec 1997



BLUE SKY DESIGN
HORNBY ISLAND

Possible New North-East Elevation 1/8" = 1'

Hornby Island Fire Hall Nov/Dec 1999



BLUE SKY DESIGN
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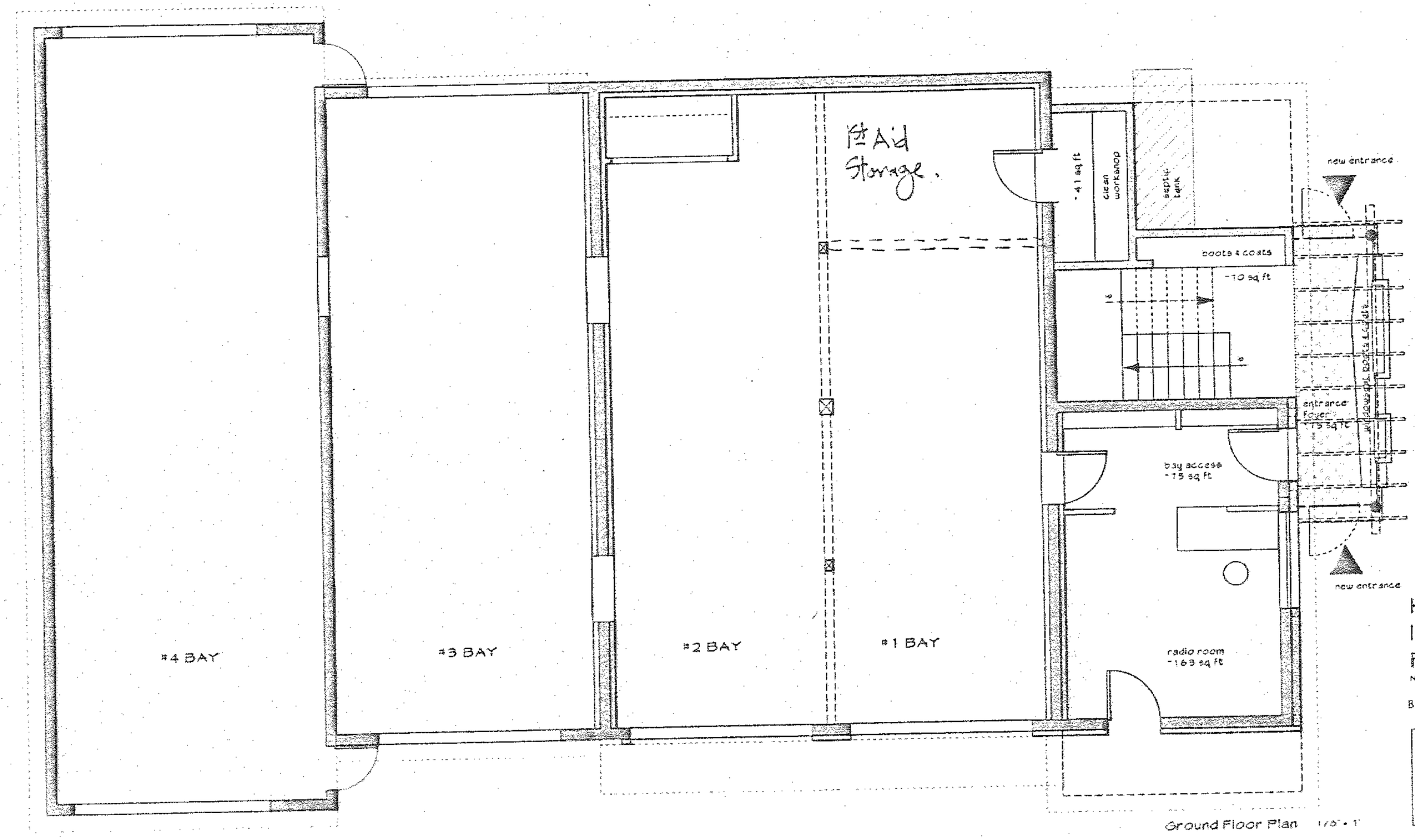
Possible New South-East Elevation 1/8" = 1'

Hornby Island Fire Hall Nov/Dec 1992



Hornby
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Fire Hall
Nov/Dec 1997

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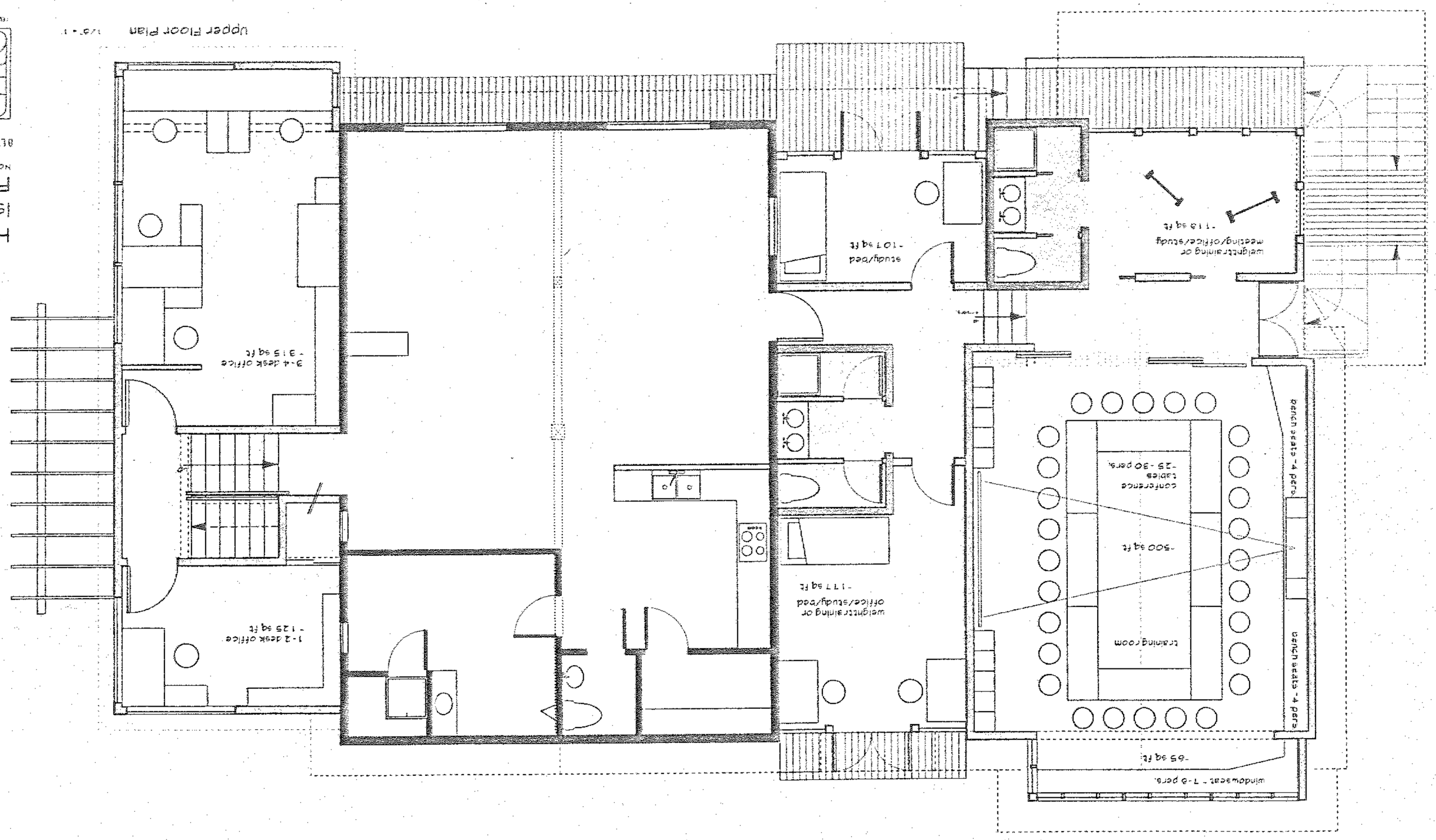
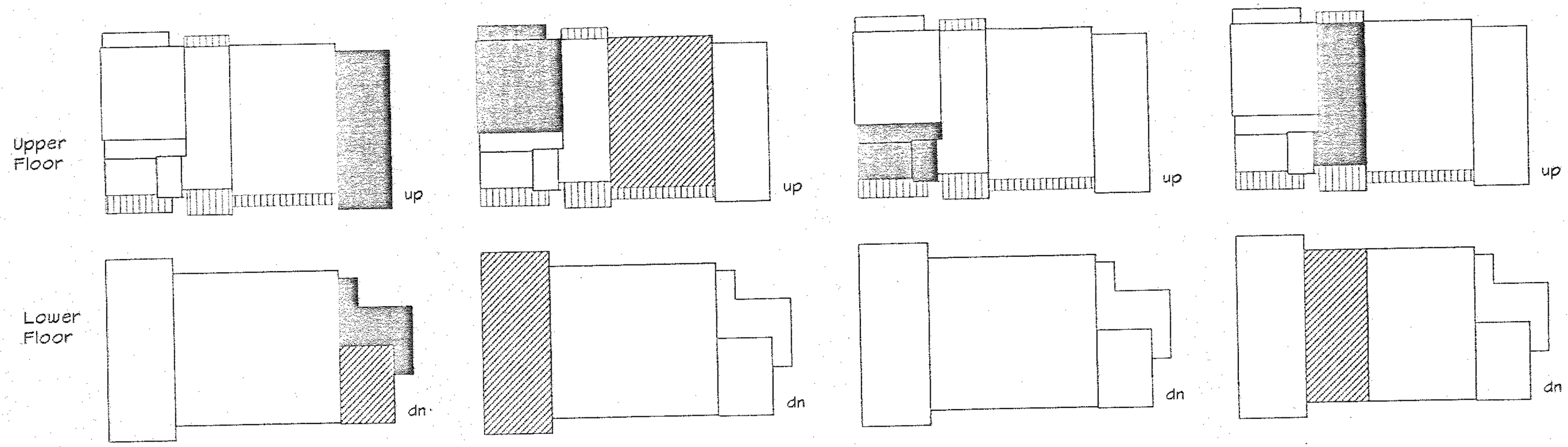


Hornby
Island
Fire Hall
NOV/Dec 1997
BLUE SKY DESIGN
HORNBY ISLAND
RR 1 Lacon Rd. Hornby Island, B.C. V0R 1Z0 Tel. (250) 335-0403



Stage One

	area	cost
New const @ $80 /sf	877	$70,187
Renovations @ $30 /sf	293	$8,777
Totals	1170	$78,963

Stage Two

	area	cost
New const @ $80 /sf	626	$50,118
Renovations @ $10 /sf	1977	$19,765
Totals	2603	$69,883

Stage Three

	area	cost
New const @ $80 /sf	315	$25,181
Renovations @ $30 /sf	0	$0
Totals	315	$25,181

Stage Four

	area	cost
New const @ $80 /sf	466	$37,260
Renovations @ $15 /sf	641	$9,615
Totals	1107	$46,875

Total Costs	New Const	Reno
Stage 1	$70,187	$8,777
Stage 2	$50,118	$19,765
Stage 3	$25,181	
Stage 4	$37,260	$9,615
	$182,746	$38,157
Grand Total	$220,903	

New Construction

Renovation

New Deck

Hornby Island Fire Hall

Nov/Dec 1991

BLUE SKY DESIGN

Administrator's Report: Cont'd

c) Janet informed the executive that, following a review of their functions, both she and Doris Stonehouse, the bookkeeper, will change to employee status under the Revenue Canada regulations effective January 1, 2000.

Financial Report: The Income statements to the end of November/99 were reviewed. There was discussion re the current review of car recycling being conducted by the committee and manager. All HIRRA services are operating within budget or within approved budget variances (ie) Administration overspending to provide employee raises based on workloads.

New Business:

1. Letter from RDCS Manager of Building Inspection, Claude Bedard re the Fire Hall buildings: The Fire Protection Services/First Responders' Program Committee and Chief have received copies of this letter and recommendations. The executive will coordinate with the Chief and Committee re plans to address the work necessary to assure a more satisfactory level of earthquake preparedness of these structures.
2. Letter from RDCS Manager of Building Inspection, Claude Bedard re the Community Hall building: This letter will be circulated to the Hall Committee and the executive will investigate, with the RDCS Treasurer, John France, the process for retaining the services of an engineer to do further studies. It was noted that this report should be discussed with local contractors who worked on the Hall building – Michael McNamara and Dennis Zbirun are two such people. The executive plans to work closely with the Hall Committee is addressing the recommendations in the report.
3. **Executive Report to the January meeting:** To include a report of the meeting with John France in December where the Fire Truck financing was revised. The Chief and Committee Chair will be presenting a resolution to revise the 2000 budget in line with the revised fire truck financing plan.
   The recommendations of the building inspection process for both the Fire Hall and the Community Hall will be read.
4. **Agenda, January Meeting:**

a) Minutes of December's meeting
b) Executive Report
c) Fire Protection Services/First Responders' Program 2000 budget revision resolution
d) Correspondence:
   i) Bylaw Referral Letter: (Tony Law will be present to give background)
   ii) Dec. 16th letter from the Islands' Trust re options for governance.
   iii) Dec 30th letter from Tony Law re Marine Protection Areas.
   iv) Report: the letter from April Lewis requesting that the RCMP donate the old office trailer for use as a teen center has been forwarded to the RCMP property management division in Vancouver.
e) Committee Reports:
   Upland Crownland Program – Tony Quin's written report
   Regional Parks Committee Report – written report
   Recycling – Car recycling program review report – Janet will give summary.
f) Adjournment.

Judith A. Lawrence

CONSULTING ENGINEERS
RON McMURTRIE & ASSOCIATES
5225 JEROW ROAD, HORNBY ISLAND, B.C. V0R 1Z0 (250) 335-1192 email: jasbreez@island.net

September 24, 2000

Hornby Island Fire Department
3850 Central Road
Hornby Island, BC
V0R 1Z0

ATTENTION: MR. GIFFORD LA ROSE, FIRE CHIEF
RE: STRUCTURAL SEISMIC EVALUATION OF FIREHALL BUILDING - PROPOSAL FOR ENGINEERING SERVICES

Dear Sir:

Thank-you for requesting my services for the seismic evaluation of the existing firehall building structure. The following outlines in detail the proposed work, fee budget and schedule.

Background

The existing firehall building is a structure of mixed construction (concrete masonry block and wood frame) that has been built over a period of several years in what appears to be three phases or sections. Phase I consists of #1 Bay, #2 Bay and the entrance wing and the second floor consisting of office and meeting/recreation rooms. Phase II consists of #3 Bay and Phase III consists of #4 Bay. The building was constructed using mainly community volunteer labour and some donated materials.

It is understood that the building was not originally built to any earthquake design codes or standards. However some seismic upgrading was applied to the main floor of the Phase I building area. Unfortunately no drawings or records are available which detail this work. It is also understood that the structural engineer who specified the upgrade did not perform any inspections of the work and that no reports exist that can certify whether the work was done in accordance with his design. The Regional District of Comox-Strathcona Building Inspector reported earlier this year that the building does not appear to be up to seismic standards. He recommends that a registered Professional Engineer perform a seismic evaluation of the structure.

Some preliminary conceptual designs and budgets were prepared by Blue Sky Design of Hornby Island in 1977 for a 2nd floor expansion and some changes to the main floor. These drawings will be useful as base plans for the purpose of this study.

Project Understanding

It is understood that the Hornby Island Residents and Ratepayers Association (HIRRA) want to have a seismic evaluation done on the firehall building as part of the emergency preparedness program. The evaluation would view the firehall as a "Post Disaster" building.
A report is needed that will address the following:

1. Assess the existing structure and note where the building is weak or suspect in its ability to resist earthquake loading.
2. Note what parts of the building require upgrading or replacement to meet the seismic requirements of the 1998 B.C. Building Code.
3. Investigate the feasibility of achieving the Code standard and outline requirements and options for upgrading and/or replacement.
4. Prepare preliminary cost estimates for the required work.
5. Provide recommendations on how to proceed with the upgrading program including further investigations and requirements for other studies (i.e. Geotechnical Report).

Project Approach

The study is proposed as a **preliminary** review. It will use a qualitative approach and will not involve extensive seismic analysis. The main thrust will be to identify areas of concern and to note parts of the building which are unsafe and require upgrading or replacement. Some structural analysis will be done to quantify bracing requirements such as at the bay garage door openings and to determine the feasibility and extent of work required to bring these areas up to standard.

The report will address the preliminary feasibility and costs of upgrading the structure and will include the effects of a proposed second floor expansion. This report is considered Stage 1 of the upgrading process and its main intention is to provide a basis for budgetary planning. Stage 2 would be at the pre-design level where further investigations would be made to provide a more detailed scope of work and construction budget. Stage 3 would be at the design level where drawings would be prepared for construction. It is at this point where the actual construction cost can be determined through the tendering process.

Comments will be made regarding the existing Phase I seismic upgrading. It is important to understand that in general what can't be seen can't be certified. Important concerns will be listed and opinions provided regarding the work done to date.

Scope of Work

The following outlines the proposed scope of work:

1. Review existing plans and have discussions with fire chief and others involved in construction to date.

2. Survey the firehall building noting details of construction on the existing plans (some measurements to verify dimensions) and identify areas of concern.
3. Perform preliminary seismic analysis.
4. List upgrade requirements.
5. Review feasibility of upgrading and conceptual solutions.
6. Estimate costs.
7. Prepare report outlining required work and recommendations.
8. Prepare simple plans to note areas requiring upgrading and/or replacement.
9. Identify further studies required and consultant reports.

It may not be feasible (cost effective) to upgrade the firehall building to the Code standard for earthquake loading. If so, the study could address different options and costs and make recommendations for improving the seismic resistance of the building. Another option is reconstruction of the building or construction of a new building to full post-disaster standards.

Budget

The proposed fee for this study (including disbursements) is $3000 plus G.S.T. A breakdown of this fee is presented below. It is proposed that the work be done and billed on an hourly basis. Hourly rate for the Professional Engineering is $50 per hour.

Task	Time	Fee
1. Meetings and review plans	2hrs	$100
2. Survey building	6hrs	$300
3. Determine upgrade requirements	8hrs	$400
4. Seismic analysis, feasibility, conceptual design	12hrs	$600
5. Estimate Costs	12 hrs	$600
6. Prepare report and plans	20hrs	$1000
Total Fees	60hrs	$3000

The project can be started immediately. It is proposed that a summary of preliminary findings be submitted to the fire chief during the 1st week of October. The final report would be submitted before the end of October.

If approved please provide your acceptance and notice to proceed in writing to the undersigned at your earliest convenience. If you have any questions or require further information please do not hesitate to call at 335-1192.

Yours truly,

Ron McMurtrie, P.Eng.

Hornby Island Volunteer Fire Department
3850 Central Road
Hornby Island, B.C.
V0R 1ZO

PRELIMINARY SEISMIC REVIEW
EXISTING FIREHALL BUILDING

Prepared by,
Ron McMurtrie, P.Eng.

November 7, 2000

CONSULTING ENGINEERS
RON McMURTRIE & ASSOCIATES
5225 JEROW ROAD, HORNBY ISLAND, B.C. V0R 1Z0 (250) 335-1192 email: jasbreez@island.net

November 7, 2000

Hornby Island Fire Department
3850 Central Road
Hornby Island, BC
V0R 1Z0

ATTENTION: MR. GIFFORD LA ROSE, FIRE CHIEF
RE: SEISMIC ASSESSMENT OF FIREHALL BUILDING

Dear Sir:

Attached is my report on the structural assessment of the firehall building with regards to seismic (earthquake) loading as per the requirements of the 1998 B.C. Building Code.

The first part of the report Sections 1 to 4 outline the findings of my investigation and preliminary seismic analysis and conclude with recommendations for possible courses of action. My basic conclusion is that to attempt to upgrade the existing building to the full requirements of the building code would not be feasible from a practical and economic standpoint. This then leaves the following options: 1. Construct a new building; 2. Demolish and rebuild the building and ; 3. Improve the seismic performance of the existing building. Preliminary costs for options 1 and 2 are included in the report. The development of cost estimates for option 3 however is a more complex issue. This will require a more detailed cost benefit analysis and further investigations.

I would be pleased to meet with the firehall committee and HIRRA executive to go over the findings of my study and discuss the possible options in more detail.

Please call me at your convenience to discuss this further.

Yours truly,

PROFESSIONAL ENGINEER
PROVINCE OF BRITISH COLUMBIA
R. J. McMurtrie

Ron McMurtrie, P.Eng.

CONSULTING ENGINEERS
RON McMURTRIE & ASSOCIATES
5225 JEROW ROAD, HORNBY ISLAND, BC VOR 1Z0 (250) 335-1192

1. INTRODUCTION

As part of Provincial Emergency Preparedness program (P.E.P.) the Hornby Island Residents and Ratepayers Association (HIRRA) want to have a seismic evaluation done on the firehall building. Buildings such as fire stations, police stations and hospitals are defined in the 1998 B.C. Building Code as "Post Disaster Buildings". These buildings are considered essential to provide services in the event of a disaster.

This evaluation is considered to be a preliminary review. It assesses the existing structure under earthquake loading as defined in Part 4 of the 1998 B.C. Building Code. The expected performance of the building and upgrade requirements are described in Section 3 of the report. Recommendations regarding options for courses of action are made in Section 4.

The existing firehall building is a structure of mixed construction (concrete masonry block and wood frame) that has been built over a period of several years in what appears to be three phases or sections. Phase I constructed in the early 1970's consists of #1 Bay, #2 Bay and the entrance wing and the second floor consisting of office and meeting/recreation rooms. Phase II consists of #3 Bay and Phase III consists of #4 Bay. The building was constructed using mainly community volunteer labour and some donated materials.

It is understood that the building was not originally built to any earthquake design codes or standards. However some seismic upgrading was applied to the main floor of the Phase I building area. Unfortunately no drawings or records are available which detail this work.

2. BUILDING SURVEY

A visual survey of the building was carried out on October 3, 2000. The purpose of the survey was to identify the lateral load resisting systems of the building and to gather information regarding construction materials and details. It was not possible to inspect many items such as reinforcing of masonry and concrete, fasteners and connection details (due to concealment by wall sheathing and finishes) However much can be deduced or inferred through examples of connection details in visible areas, general construction practices used in the building and the age of the structure. Some measurements were made to verify the dimensions shown on the existing plans and to verify member sizes etc. Masonry walls were "tapped" with a hammer to determine whether they were hollow or grouted solid.

A detailed summary and description of the main structural elements of the building and a list of observations that are pertinent to the seismic assessment of the building is contained in the Appendix (refer to the attached drawings for the locations of the components).

3. STRUCTURAL ASSESSMENT

3.1 SEISMIC EVALUATION

A preliminary seismic analysis was performed on the building. The lateral earthquake forces were calculated in accordance with the 1998 B.C. Building Code and include the addition of a second floor wood frame addition over Bays #3 and #4. The purpose of the analysis was to evaluate existing building elements and to determine upgrading requirements.

The seismic evaluation indicates that most or all of the existing building components are not capable of resisting the seismic loads or are not properly detailed, anchored or interconnected to ensure continuity of load path down to the foundation. The situation is worsened by the fact that an incompatible mixture of rigid and elastic building materials are used in different parts of the building and in different orientations. Hence potentially large displacements accommodated by flexible wood framing systems could lead to brittle failure of rigid unreinforced masonry elements. Or conversely loads that could be resisted by the wood systems may not get transferred to these elements until after failure of the stiff masonry elements has occurred. The National Research Council of Canada (NRC) in its Structural Commentaries of Part 4 of the building code states that "large dissimilarities in the stiffness and ductility characteristics of framing systems in the orthogonal directions should be avoided".

3.2 SUMMARY OF FINDINGS

It is expected that the existing firehall building would perform poorly in a significant seismic event (earthquake). The main reasons for this are: **1.** The use of unreinforced and under reinforced concrete block masonry in much of the main floor walls. Unreinforced masonry is perhaps the worst building material to use in a high seismic zone (it is not permitted in the B.C. Building Code). **2.** The existence of large poorly braced openings in the south-east face of the building and the north-west face in Bays #3 and #4.
3. Deficiencies in the detailing of and anchorage and connections between horizontal force resisting elements (roof and floor diaphragms) and vertical elements (shearwalls) and vertical elements to foundation (including hold-down anchorage against uplift).
4. Inadequate anchorage of vertical load carrying systems (floor and roof joists and trusses) to their supports (bearing walls and beams).

3.3 POTENTIAL FAILURE MODES

During a strong earthquake the following failures could occur: **A.** Extreme damage and/or collapse of masonry walls. Blocks may also become dislodged and sent flying through the air at great risk of injury or even death to persons standing near the walls (especially outside the exterior unreinforced walls). **B.** Excessive sway and/or collapse of walls and framing at the garage doors. **C.** Failure and possible collapse of the masonry/stud wall along Grid A from seismic induced soil load. **D.** Failure and possible collapse of the masonry/stud wall on Grid B due to unreinforced masonry section and poor anchorage of studwall. **E.** Failure of second storey wood frame shearwall piers (between windows). **F.** Floors and roofs could be pulled off of their supports (beams and bearing walls) and collapse onto the floor below. **G.** Failure and potential collapse or buckling of plywood shearwalls (added as seismic upgrade elements) due to out-of-plane loads from the unreinforced block walls impacting the stud walls. This could lead to further collapse of floors and walls above. **H.** Failure of main floor shearwalls as a result of insufficient anchorage to foundation for both lateral loads and uplift from overturning moments. **I.** Excessive damage, failure and possible collapse of walls due to insufficient lateral support and load transfer from floor and roof diaphragms.

3.4 COMMENTARY ON EXISTING SEISMIC UPGRADING

It is understood that the addition of studwalls and sheathing to the main floor in Bays #1 and #2 and in Bay #3 along Grid C was part of a seismic upgrading done a number of years ago (there are no drawings or engineer's reports available that detail or certify this work). The performance of the plywood shearwalls for in-plane seismic loading is dependant on the nailing pattern of the plywood and the anchorage of the walls to the roof/floor diaphragm above and the slab below. If properly nailed and anchored it is likely that these walls could provide good lateral seismic resistance to this part of the building. The performance of these walls will also depend upon the connection of the floor and roof (Bay #3) to the original masonry walls. If this connection is strong, loads will get transferred to the stiffer masonry walls before enough displacement in the wood walls has occurred to absorb the load. This could lead to damage or failure in the masonry walls before loads can get picked up by the wood shearwalls.

Performance in out-of-plane seismic loading is of greater concern. The block wall could buckle outward under lateral load and cause blocks to break free and fall which would be very dangerous. Conversely the relatively heavy block walls could transfer loads to the studwalls. Calculations show that the 12' long 2x4 studs do not have adequate strength to resist this load. This could result in buckling or collapse of the stud walls.
The work done to brace the garage door openings in Bays #1 and #2 does not appear adequate to resist the full seismic loading. The system of exterior 2x4 and plywood reinforcing with steel connecting plates is connected to a shearwall on Grid 4, E-F. Calculations show that a larger shearwall with high anchorage requirements and a collector strut running the full width of Bays #1,#2 and #3 with adequate connection to the horizontal diaphragms above is required.

The anchoring of the timber posts and beams along Grid D will help prevent the beams from being pulled off the posts and the posts from kicking out from under the beams. This work was not analyzed in detail.

3.5 UPGRADING TO 1998 BUILDING CODE

Upgrading the existing building to the full requirements of the 1998 B.C. Building Code for seismic loading would be a huge undertaking. There would be three parts to this work.

Part 1 would be the removal (or demolition) of building elements (for example some of the main floor walls) and subsequent rebuilding or replacement. This could also include additional foundation or anchorage elements that may necessitate removal and replacement of sections of the existing floor slab.

Part 2 would involve "gutting" of large areas of the building (example floors, roofs and walls) and subsequent upgrading of existing components and retrofitting and/or addition of new structural elements, connectors and anchors. This gutting would involve the removal of exterior finishes and sheathing and/or interior finishes in much of the building. Once the upgrading is done the finishes and wall coverings would have to be reapplied or replaced and/or cosmetically repaired and resealed from the weather.

Part 3 of the work would be the addition of new lateral load resisting elements to the existing layout. Examples of this include the addition of anchored wingwalls beyond the perimeter of the existing building to brace the large garage door openings.

The unit costs of renovating and retrofitting building components are often several times the unit cost of new construction. In addition inherent weakness in the layout of the building and in the building materials would make upgrading to the full Code requirements very difficult to achieve. It is the author's opinion that reaching the Code standard would be extremely onerous from a practical standpoint and unrealistic from an economic perspective.

3.6 GENERAL IMPROVEMENTS TO SEISMIC RESISTANCE

It is possible to improve the seismic performance of the firehall building without going to the full extent of satisfying all aspects of the building code. This program could involve: **1.** Replacing, upgrading and/or reinforcing existing structural components; **2.** Adding some new seismic resisting elements to the building and; **3.** Adding and improving anchorages to existing elements and their connections to other elements.

Examples of the most effective components that could be included in the above program include:

1. Main floor walls.
2. Anchored shear resistant wing-walls outside the existing perimeter of the building (including collector struts and anchorage to existing diaphragms).

3. Main floor shearwall anchorage. Connections of diaphragms to shearwalls. Anchorage of floor and roof systems to bearing walls and beams.

The objective of this type of program would be to improve the seismic performance of the building as much as possible within budgetary constraints. Obviously there would come a point (or points) where continued spending would not result in significant improvement to the seismic resistance of the building. The critical consideration is reducing the probability or likelihood of a collapse in the building during an earthquake. It is considered beyond the scope of work of this assignment to perform this kind of detailed cost/benefit and probability analysis.

3.7 CONCLUSIONS

It is concluded that it is not likely feasible from a practical and economic standpoint to upgrade the existing firehall building to the seismic requirements of the 1998 B.C. Building Code. It is however possible to make some improvements to the seismic performance of the building. The costs and details of an upgrading program including the expected benefits versus money spent will require a more detailed economic and structural analysis and a more detailed investigation of the existing building construction.

There are also other options to be considered. These include the construction of a new firehall building and the demolition and reconstruction of the existing building to the requirements of the 1998 B.C. Building Code. The three options are considered in the following section.

4. RECOMMENDATIONS

4.1 CONSTRUCT NEW BUILDING

To meet the guidelines of the P.E.P. a new "post disaster" firehall building constructed to the seismic requirements of the 1998 B.C. Building code would provide a building capable of providing essential services in the event of an earthquake. The existing firehall building could be used for other purposes such as workshops, manufacturing or processing of automotive repair etc. Revenue could be generated through the sale or lease of this facility.

The cost of a new building based on concrete slab and foundation with wood-frame construction is estimated at approximately $100/sq.ft. for main floor truck bays (12' ceilings) and $125 per square foot for second floor offices, meeting rooms and recreation areas (8' ceilings).

The existing building main floor area (Bays #1, #2, #3 and #4) is 2600 sq.ft. (this does not include the small entrance wing). This would result in a new cost of about $260,000. The existing second floor area is 1400 sq.ft. New cost would be $175,000. Total cost to replace the existing building is estimated at $435,000. Expanding the second floor to

2600 sq.ft. (match main floor area) would result in a total estimated building cost of $585,000. Land acquisition, site preparation and servicing costs would need to be added to this total.

4.2 DEMOLISH AND REBUILD

The existing building could be taken down and a new "post-disaster" building constructed in its place. Cost of new construction would be as in section 4.1 above. Land acquisition, site preparation and servicing costs would not be required. An allowance would be required for the demolition of the building. This could be offset by the salvage of building materials for sale or reuse.

4.3 IMPROVE EXISTING BUILDING

The option of upgrading the existing building has been discussed in sections 3.6 and 3.7 above. Further engineering and economic study would be required to assess the merits of this option. One consideration would be to rebuild Bays #3 and #4 complete with a second floor to the seismic standards of the building code. Ideally this would be constructed independently from Bays #1 and #2 and could form the "post disaster" section of the overall facility. Essential services and equipment could be housed in this section.

Costs for rebuilding Bays #3 and #4 complete with full second floor would be as described in section 4.1. For main and second floor areas of 1500 sq.ft. each the total estimated cost is $337,500. An allowance for the demolition of the existing bays and an additional sum for excavation and earthwork would also be required.

APPENDIX

I. Firehall Survey Notes and Observations
II. Firehall Drawings

I. SURVEY NOTES AND OBSERVATIONS

A. MAIN FLOOR

Item	Location	Description & Comments
1A.	Grid A, 1-5	Exterior bearing wall. 13'4" tall (6'8" bottom half 8" concrete block/6'8" top half 2x6 stud (unknown spacing) with 3/8" plywood) x 48'long. Supports #4 Bay roof. (A block = A stud = 320 sq.ft. A total = 640 sq.ft.)

- Wall not continuous from floor to ceiling (hinge at ½ height at block/stud joint). No lateral support provided at hinge.
- Details of block reinforcing unknown (solid vertical grout cores at 48" o/c). Photographs show vertical bars and slab dowels. Top course is solid grouted. Block, grout and mortar strength and specifications unknown.
- Wall founded on slab (edges thickened).
- Soil pressure from backfill against block wall. Block wall is not built as a retaining wall (i.e. cantilevered footing and special reinforcement or buttressing) or a basement wall (i.e. special reinforcement and lateral support at top of wall). Soil backfill approx. 2' to 4'wide between cut slope (conglomerate rock) and wall. Soil pressure considerably less than if cut made in granular soil slope. No evidence of excessive displacement, rotation or bulging of block wall. Some effervescence noted in mortar joints.
- Nailing pattern of plywood (size and spacing) unknown. At base of stud wall evidence that plywood does not extend down to bottom plate. Perimeter nailing appears to be to studs only. Anchorage of stud wall to block wall unknown.

2A.	Grid B, 2-4	Interior bearing wall. 12' tall from Bay #3 slab to ceiling (4' bottom section 8"concrete block/8' top section 2x6 at 24" o/c stud with 5/8" plywood) x 40' long. Supports Bay #3 roof and Bay #4 roof via short pony stud wall built on top of Bay #3 roof. (A block = 160 sq.ft. A stud = 320 sq.ft. A total = 480 sq.ft.)

- Wall not continuous from floor to ceiling. Hinge at 4' height at block/stud joint.
- Block wall exposed at a doorway cut between #3 and #4 Bays. Hollow unreinforced masonry block except solid grout top course and wire "ladder" reinforcement every second course in mortar joints. No vertical reinforcement.

Block, grout and mortar strength and specifications unknown. Wall appears to be founded on slab. Anchorage to slab is unknown.

- 14" +/- step in slab elevation occurs on either side of wall from #4 to #3 Bays.
- Nailing pattern of plywood (size and spacing) unknown (drywall covering). Anchorage of stud wall to block wall and to roof over unknown.

3A. Grid C, 2-4 Interior bearing wall. 12' tall x 40' long. 8" concrete block sandwiched between two 2x4 at 16"o/c studwalls each with 3/8" plywood sheathing. Supports #3 Bay roof, 2nd floor loads and 2nd floor roof loads via the 2nd floor stud-bearing wall over. (A total sandwich wall = 480 sq.ft.)

- Block wall reinforcement unknown (but likely hollow and unreinforced as evidenced in wall on Grid 2, C-E and Grid E, 2-4. Top course likely solid grouted). Anchorage of block to floor/roof over and to concrete floor slab unknown. Block, grout and mortar strength and specifications unknown.
- Nailing pattern of plywood (size and spacing) unknown (drywall covering). Anchorage of stud wall to roof/floor above and concrete floor slab unknown.
- Anchorage of shearwall elements against uplift unknown.

4A. Grid D, 2-4 Post and beam row. 12' high ceiling x 40'+/- long. Built-up lumber beam on timber posts. Supports 2nd floor Loads.

- Posts anchored to floor slab with steel angle plates and bolts.
- Posts attached to beams with nailed-on plywood gussets and/or bolts and steel plates.
- Anchorage of 2nd floor to beams unknown.
- Anchorage of beam to block wall (Grid 2 @ D) unknown.

5A. Grid E, 2-4 Bearing wall. 12' tall x 40' long. 8" concrete block with one interior 2x4 studwall at 16" o/c sheathed with 3/8" plywood. Supports 2nd floor loads above #1 Bay and 2nd floor roof loads via the 2nd floor stud bearing wall over and 2nd floor office loads via a lumber ledger bolted to the block wall at an 8' height (from Grid 3 to 4). (A = 480 sq.ft.)

- Block wall hollow/unreinforced. Top course solid grouted. Anchorage of block to floor over and to concrete floor slab unknown. Block, grout and mortar strength and specifications unknown.
- Nailing pattern of plywood (size and spacing) unknown (drywall covering). Anchorage of stud wall to floor above and concrete floor slab unknown.
- Anchorage of shearwall elements against uplift unknown.

6A. Grid F, 3-4 Exterior bearing wall. 8' tall x 20'6" long. 8" concrete block with exterior siding. Supports 2nd floor office floor roof loads over via exterior studwall (A = 164 sq.ft.)

- Block wall hollow/unreinforced. Top course grouted solid. Lintel beam over window grouted solid (reinforcement unknown). Anchorage of block to floor over and to concrete floor slab unknown. Block, grout and mortar strength and specifications unknown.

7A. Grid 1, A-B
Grid 5, A-B
Garage door end piers (non-bearing). 13'4" tall (6'8" bottom half 8" concrete block/6'8" top half 2x6 stud with 3/8" plywood) x 1'4" wide one side and 2'8"wide other side of garage door opening.

- Piers not continuous from floor to ceiling (hinge at ½ height at block/stud joint).
- Details of block reinforcing unknown. Photographs show vertical bars and slab dowels. Vertical cores solid grouted. Top course solid grouted. Block, grout and mortar strength and specifications unknown.
- Nailing pattern of plywood (size and spacing) unknown. At base of stud wall evidence that plywood does not extend down to bottom plate. Perimeter nailing appears to be to studs only. Anchorage of stud wall to block wall and roof over unknown.

8A. Grid 2, B-C
Grid 4, B-C
Garage door end piers (non-bearing) 12' tall (4' bottom section 8" concrete block/8' top section 2x6 studwall with plywood sheathing) x 1'8" wide one side and 2'8" wide other side of garage door opening.

- Piers not continuous from floor to ceiling (hinge at 4' height at block/stud joint).
- Block portion hollow/unreinforced. Top course grouted solid. Block, grout and mortar strength and specifications unknown.
- Nailing pattern of plywood (size and spacing) unknown. Anchorage of stud wall to block wall and roof over unknown.

9A. Grid 2, C-E
Exterior wall (non-bearing except for beam point loads and gable end loads from wood frame second second floor) 12' tall x 27'long. 8" concrete block with interior 2x4 studwall at 16" o/c and plywood sheathing. (A = 324 sq.ft.)

- Block wall hollow/unreinforced. Top course grouted solid. Anchorage of block to floor over and to concrete floor slab unknown. Block, grout and mortar strength and specifications unknown.
- Lateral support of top of wall by floor diaphragm unknown.
- Nailing pattern of plywood (size and spacing) unknown (drywall covering). Anchorage of stud wall to floor above and concrete floor slab unknown.
- Anchorage of shearwall elements against uplift unknown.

10A. Grid 4, C-E
Garage door posts/framing. 12' tall timber and/or built-up

lumber vertical members with applied exterior reinforcing of 2x4 stud and plywood sheathing connected with bolted steel gusset plates at top of columns and steel angles anchored to slab at column bases. Outside posts at Grids C and E are non-load bearing (framing for overhead doors). Central post at Grid D is load bearing (supports timber beam Grid D).

- Construction details of timber/built up lumber posts unknown (not visible).
- Details of plywood/2x4 reinforcing unknown (i.e. nailing pattern of plywood).
- Steel gusset plates connect post reinforcing to horizontal reinforcing member (2x4 with plywood sheathing) at top of doorways. The gusset at Grid E appears to be connected to an exterior applied plywood sheathed wall on Grid 4 from E to F (see Item 11 below).
- Base of posts/reinforcing connected to slab with steel plates and bolts.
- Connection of horizontal reinforcing member to floor above unknown.

11A. Grid 4, E-F — Exterior wall (non-bearing except for gable end loads from wood frame wall above). 8' tall x 14' long. 8" concrete block with exterior plywood sheeted 2x4 studwall (unknown spacing). (A = 112 sq.ft.)

- Block wall hollow/unreinforced. Top course grouted solid. Lintel beam over door grouted solid (reinforcement unknown). Anchorage of block to floor over and to concrete slab unknown. Block, grout and mortar strength and specifications unknown.
- Lateral support of top of wall by floor diaphragm unknown.
- Nailing pattern of plywood (size and spacing) unknown (siding covering). Anchorage of stud wall to floor above and concrete slab unknown.
- Anchorage of shearwall elements against uplift unknown.

12A. Grid 3, E-F — Exterior wall (non-bearing except for gable end loads from wood frame wall above). 8' tall x 14' long. 8" concrete block with exterior cedar siding. (A = 112 sq.ft.)

- Block wall hollow/unreinforced. Top course grouted solid. Anchorage of block to floor over and to concrete slab unknown. Block, grout and mortar strength and specifications unknown.
- Lateral support of top of wall by floor diaphragm unknown.

B. MAIN FLOOR ROOF AND SECOND FLOOR SYSTEMS

Item	Location	Description & Comments
1B.	#4 Bay	Roof framing and diaphragm. Flat roof 19'wide x 50'long. Plywood sheathing on 1" strapping on 2x10 joists @ 12" o/c. Drywall ceiling. (A = 950 sq.ft.)

- Plywood diaphragm thickness and nailing pattern (size and spacing) unknown.
- Plywood panel edges unblocked.
- Diaphragm chord details unknown.
- Connection of diaphragm to shearwalls unknown.
- Anchorage of roof framing to bearing walls unknown.

2B. #3 Bay — Roof framing and diaphragm. Flat roof 16'wide x 42'long. 5/8" plywood sheathing on 2x8 joists @ 16"o/c. Drywall ceiling. (A = 670 sq.ft.)

- Plywood diaphragm nailing pattern (size and spacing) unknown.
- Plywood panel edge blocking unknown.
- Diaphragm chord details unknown.
- Connection of diaphragm to shearwalls unknown.
- Anchorage of roof framing to bearing walls unknown.

3B. #1/#2 Bay — Floor framing and diaphragm. 28' wide x 40' long. Plywood (assumed) on lumber joists (size and spacing unknown). Drywall ceiling. (A = 1120 sq.ft.)

- Plywood diaphragm thickness and nailing pattern (size and spacing) unknown.
- Plywood panel edge blocking unknown.
- Diaphragm chord details unknown.
- Connection of diaphragm to shearwalls unknown.
- Anchorage of floor framing to bearing walls and beams unknown.
- Opening in floor diaphragm for hose tower.

4B. Office wing — Floor framing and diaphragm. 14' wide x 20' long. Plywood on 2x10 @ 16"o/c. Drywall ceiling. (A = 280 sq.ft.)

- Plywood diaphragm thickness and nailing pattern (size and spacing) unknown.
- Plywood panel edge blocking unknown.
- Diaphragm chord details unknown.
- Connection of diaphragm to shearwalls unknown.
- Anchorage of floor framing to bearing walls unknown.
- Opening in floor diaphragm for stairway.

C. SECOND FLOOR

Item	Location	Description & Comments
1C.	Grid C, 2-4 Grid E, 2-4	Exterior bearing walls. 10' tall x 40' long. Cedar siding on 3/8" plywood on 2x6 studs (unknown spacing) with interior drywall. Support roof trusses spanning from Grid C to E and part of roof over office wing (Grid E, 3-4 only).

(A = 800 sq.ft. (2 walls at 400 sq.ft. each)).

- Nailing pattern (size and spacing) of plywood unknown.
- Plywood panel edge blocking unknown.
- Connection to roof above and floor below unknown.
- Anchorage of shearwall elements against uplift unknown.
- Anchorage of lintel beams to supports unknown.

2C. Grid 2, C-E / Grid 4, C-E — Exterior non-bearing walls. 10' tall x 28' long. Cedar siding on 3/8" plywood on 2x6 studs (unknown spacing) with interior drywall. (A = 560 sq.ft. (2 walls at 280 sq.ft. each)).

- Nailing pattern (size and spacing) of plywood unknown.
- Plywood panel edge blocking unknown.
- Connection to roof above and floor below unknown.
- Anchorage of shearwall elements against uplift unknown.
- Lateral support of top of wall by roof system unknown.

3C. Grid F, 3-4 — Exterior bearing wall 8' tall x 20' long. Cedar siding on plywood on 2x6 studs (unknown spacing) with drywall interior. Supports office roof loads. (A = 160 sq.ft.)

- Nailing pattern (size and spacing) of plywood unknown.
- Plywood panel edge blocking unknown.
- Connection to roof above and floor below unknown.
- Anchorage of shearwall elements against uplift unknown.
- Anchorage of lintel beams to supports unknown.

4C. Grid 3, E-F / Grid 4, E-F — Exterior non-bearing walls. 8' tall x 14' long. Cedar siding on plywood on 2x6 studs (unknown spacing) with interior drywall. (A = 220 sq.ft. (2 walls at 110 sq.ft. each)).

- Nailing pattern (size and spacing) of plywood unknown.
- Plywood panel edge blocking unknown.
- Connection to roof above and floor below unknown.
- Anchorage of shearwall elements against uplift unknown.
- Lateral support of top of wall by roof system unknown.

D. SECOND FLOOR ROOF SYSTEM AND HOSE TOWER

Item	Location	Description & Comments
1D.	Main area	Roof framing and diaphragm. 5:12 sloped peaked roof. 32' wide x 44' long. Metal roofing on existing shingles on strapping on plywood on home-made roof trusses at 24"o/c. Drywall ceiling. (A = 1400 sq.ft.)

- Plywood diaphragm nailing pattern (size and spacing) unknown.
- Plywood panel edge blocking unknown.
- Diaphragm chord details unknown.
- Connection of diaphragm to shearwalls unknown.
- Anchorage of roof framing to bearing walls unknown.

2D. Office area — Roof framing and diaphragm. 5:12 slope. 16' x 24'. Metal roofing on shingles on strapping (assumed) on plywood on lumber joists. Drywall ceiling. (A = 380 sq.ft.)

- Plywood diaphragm nailing pattern (size and spacing) unknown.
- Plywood panel edge blocking unknown.
- Diaphragm chord details unknown.
- Connection of diaphragm to shearwalls unknown.
- Anchorage of roof framing to bearing walls unknown.

3D. Hose tower — 8' x 6' x 32' tall. From main floor to above roof. Plywood sheathing on stud frame construction.

- Laterally supported by floor and roof diaphragms.
- Details of framing and connections at floor and roof unknown.
- Anchorage to floor slab unknown.
- Nail spacing on plywood sheeting 6" to 8" on average (nail size unknown). Panel edges unblocked.

E. MAIN FLOOR AND FOUNDATION

Item	Location	Description & Comments
1E.	Main floor	Concrete floor slab throughout. 6" thick observed at two test excavations outside of #1 Bay on Grids 2 and E. (A total = 2900 sq.ft.)

- Thickness throughout building unknown.
- Reinforcing unknown.
- No evidence of excessive cracking or differential settlement.

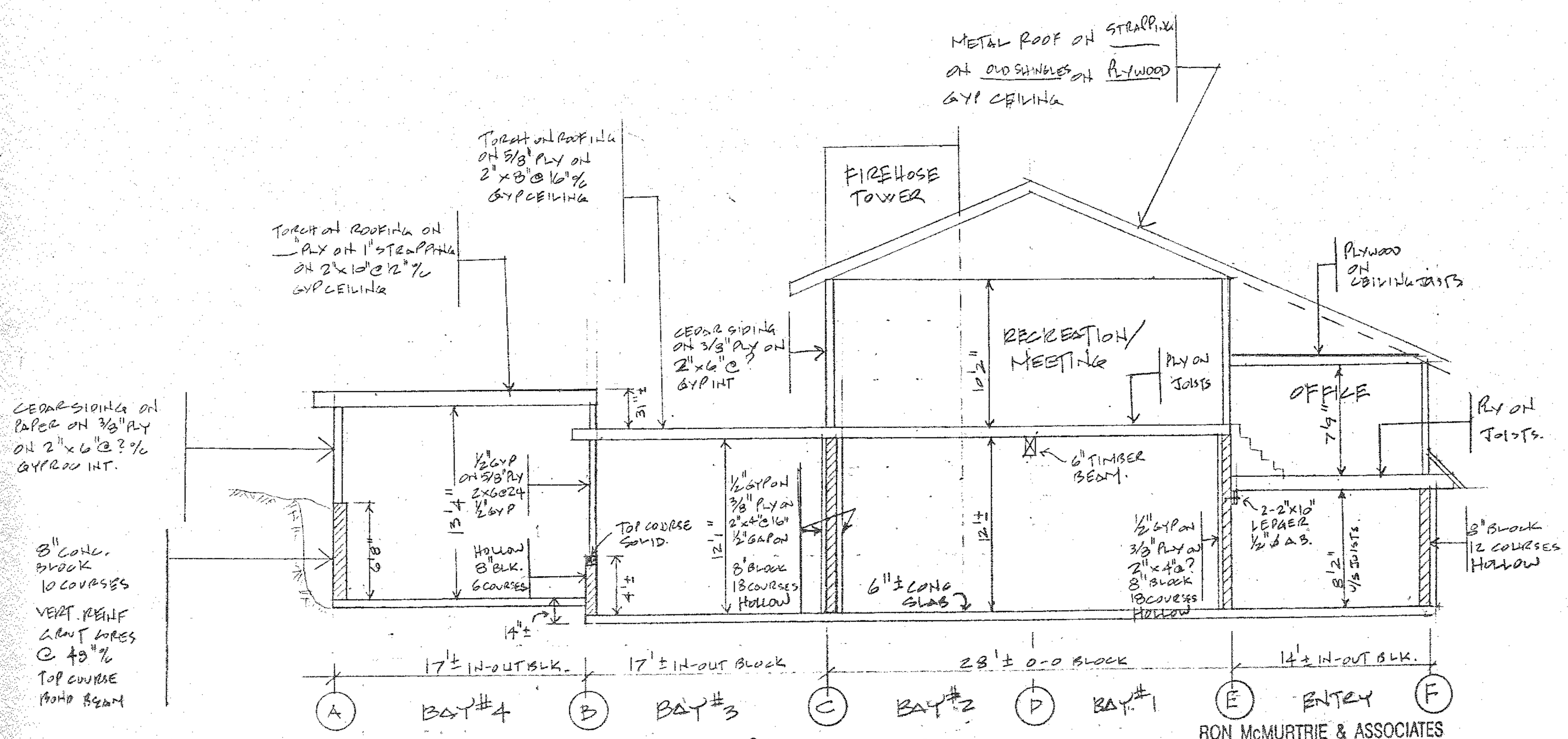
2E. Foundation — Thickened concrete slab footings. 8" to 10" thick observed at two test excavations outside of #1 Bay on Grids 2 and E. Founded on compacted sandy gravel material on conglomerate bedrock (same test excavations).

- Thickness of footings throughout building unknown.
- Interior bearing wall footings unknown.
- Post footings (Grid D) unknown.
- Width of thickened slab footings unknown.
- Founding soil/rock throughout building unknown.

- Reinforcing unknown.
- No evidence of excessive cracking or differential settlement (verified by absence of cracking in unreinforced masonry walls).

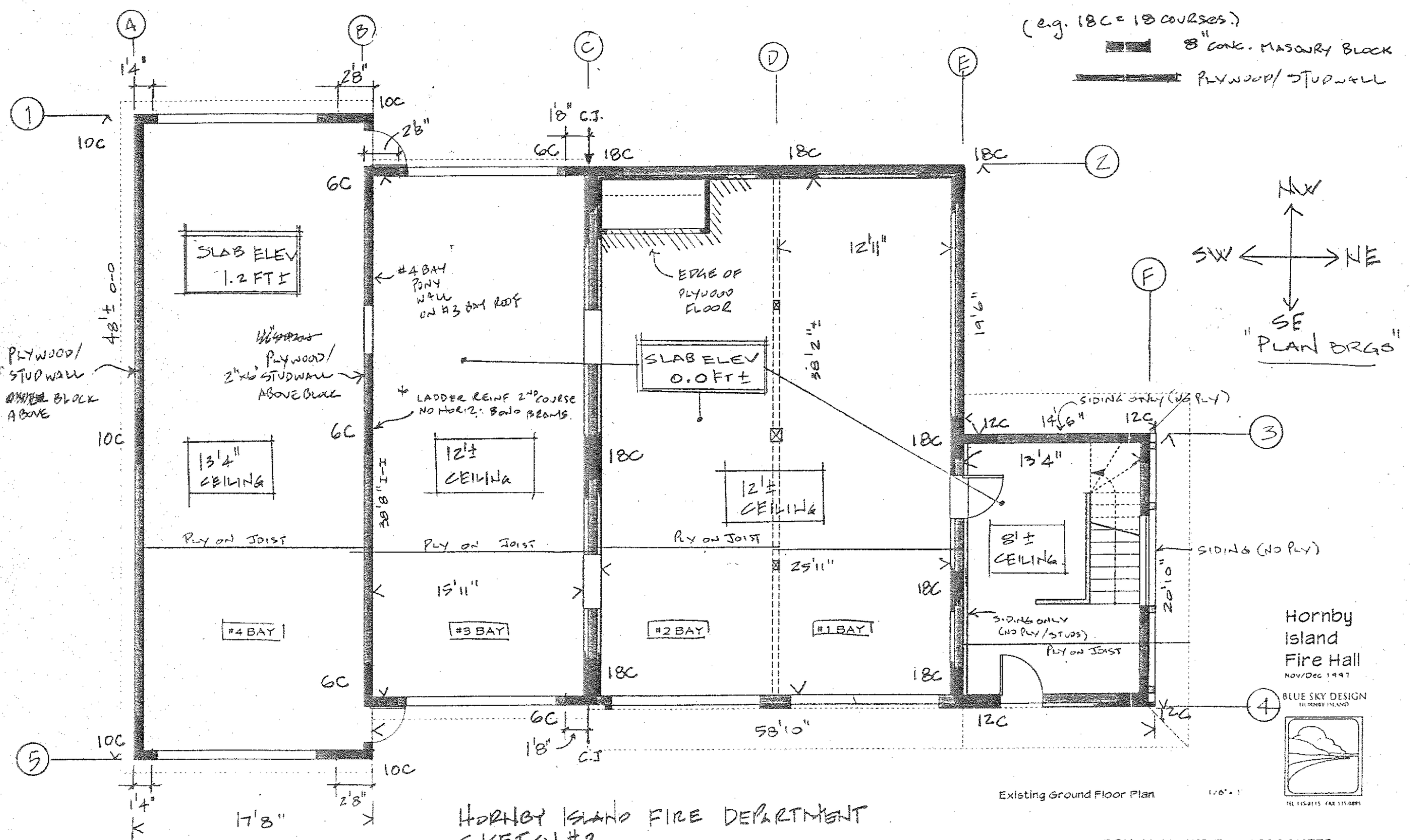
F. GENERAL OBSERVATIONS

- Appears to have been constructed in 3 Stages.
- Stage I: Bays #1 and #2; Entry/office wing and; Second floor area.
- Stage II: Bay #3.
- Stage III: Bay #4.
- Seismic upgrading (plywood studwalls) applied to Bays #1 and #2 and to Bay #3 on Grid C.
- Bay #3 not constructed integrally with Bay #2 (vertical construction joint along Grid C). Bay #3 roof shares bearing wall with Bay #2 (Grid C).
- Bay #4 not constructed integrally with Bay #3. Bay #4 roof is supported on top of Bay #3 roof by short pony wall (Grid B).
- Bay #4 roof not in same horizontal plane as rest of building (30" higher)
- Bay #4 floor slab not in same horizontal plane as rest of building (14" higher)
- Bay #4 end bay walls not in same vertical plane as rest of building (extends 4' beyond on each end).
- Bays #1 and #2 and entry wing constructed of heavy/rigid/brittle unreinforced masonry walls (on main floor).
- Bays #3 and #4 constructed mainly of light/flexible/elastic wood frame walls.
- Bays #1 and #2 have very large openings in 1 wall (Grid 4) and small openings elsewhere.
- Bays #3 and #4 have very large openings in both end walls and small openings in side walls.
- Center of rigidity of building as a whole is not close to center of gravity.



RON McMURTRIE & ASSOCIATES
CONSULTING ENGINEERS
PROJ. NO. 2000-03

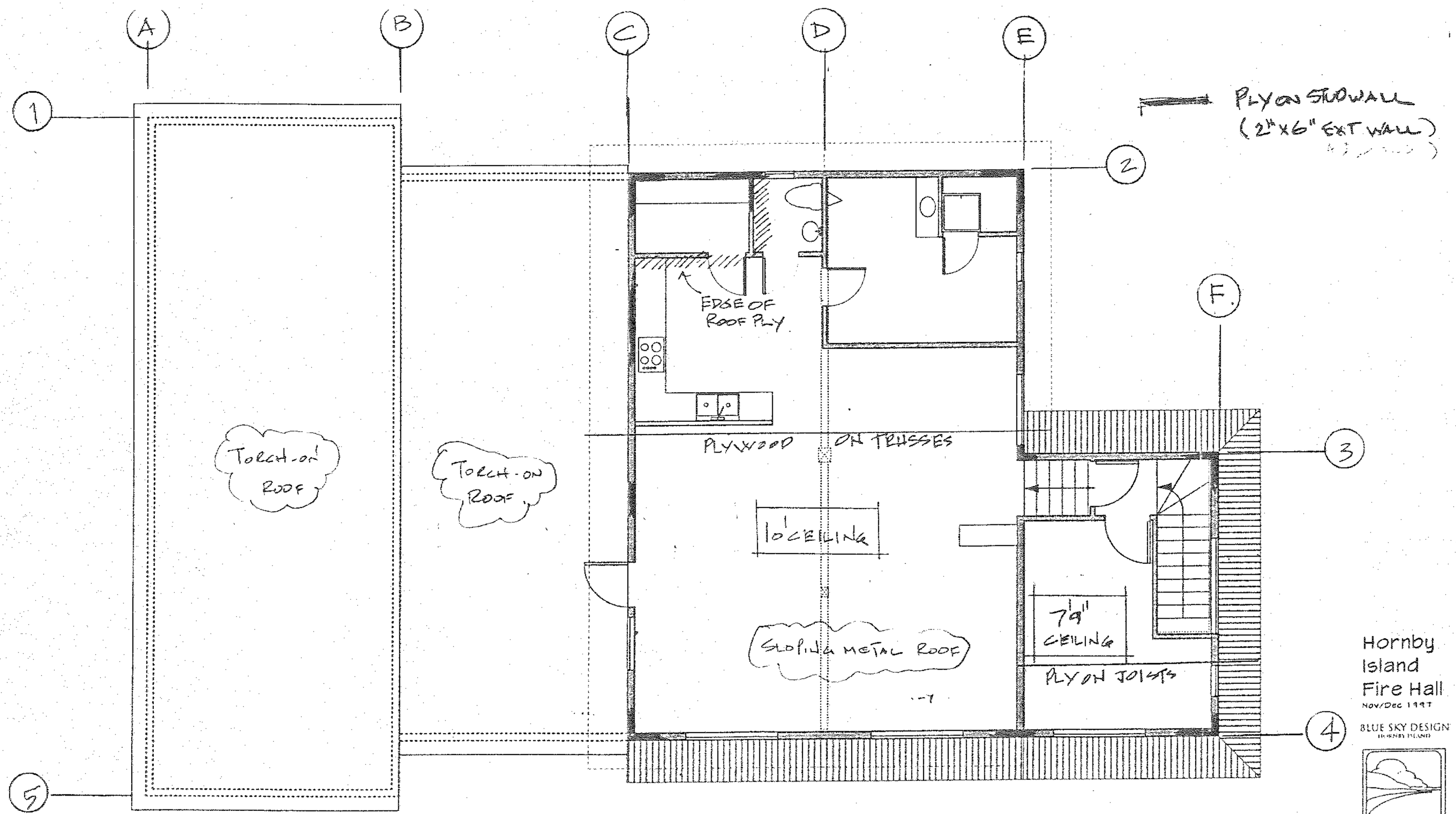
OCT 5, 2000 HORNBY ISLAND FIRE DEPT. (NOT TO SCALE).
SKETCH #1, BY: RM



HORNBY ISLAND FIRE DEPARTMENT
SKETCH #2
BY: RM OCT. 19, 2000

RON McMURTRIE & ASSOCIATES
CONSULTING ENGINEERS

PROJECT NO. 2000-03



Hornby Island Fire Hall
Nov/Dec 1997

BLUE SKY DESIGN
HORNBY ISLAND

Existing Upper Floor Plan 1/8" = 1'

RON McMURTRIE & ASSOCIATES
CONSULTING ENGINEERS

PROJECT NO. 2000-03

HORNBY ISLAND FIRE DEPT.
SKETCH #3
BY: RM OCT 19, 2000

CONSULTING ENGINEERS
RON McMURTRIE & ASSOCIATES

5225 JEROW ROAD, HORNBY ISLAND, B.C. V0R 1Z0 (250) 335-1192 email: jasbreez@island.net

November 27, 2000

Hornby Island Fire Department
3850 Central Road
Hornby Island, BC
V0R 1Z0

ATTENTION: MR. GIFFORD LA ROSE, FIRE CHIEF
RE: UPGRADE COST ANALYSIS – HORNBY FIREHALL

Dear Sir:

Further to our recent meeting with the Firehall Committee and HIRRA executive I am pleased to submit this proposal for further investigation into the proposed seismic upgrading of the existing firehall building.

Project Understanding and Scope of Services

Following our meeting and further discussions with the Fire Chief the direction we are headed is to assume that Bays #3 and #4 will be taken down and reconstructed. The new construction will be to the latest seismic requirements of the B.C. Building Code. The new #3 and #4 area will be a separate structure independent from Bays #1 and #2. The new structure would be a clear span (no wall between #3 and #4 Bays) and would be built as a 1-storey building designed to accept a second floor in the future.

Bays #1 and #2 (including 2nd floor area) will be retained and upgraded as much as budget and practicality permits. It was concluded that it was not practically or economically realistic to upgrade this section to the full requirements of the building code. However it is agreed that the existing seismic upgrading could be improved upon.

It is my understanding that the following is required at this time:

A. Bays #1 and #2

1. Investigate and identify seismic upgrading options for the Bay #1 and #2 area (including 2nd floor).
2. Estimate and analyze costs of upgrading versus seismic performance.
3. Make recommendations for course of action to be taken.

The results of this will be used to assist in budgetary planning.

B. Bays #3 and #4

1. Estimate cost for taking down Bays #3 and #4.
2. Estimate cost for excavation to lower slab in Bay #4 and bank cutting (if required)
3. Assist Fire Chief in estimating other associated costs (piping, approach grading etc)
4. Assist in preliminary planning and siting for new #3/#4 building.
5. Review costs for new building.

Again, this information will be used for budgetary planning purposes.

My proposed services include the following:

1. Preliminary seismic analysis for Bays #1 and #2 only (previous analysis considered Bays #1 to #4 as a whole). Determine upgrade requirements/options.
2. Determine costs as described in A above.
3. Perform work required in B above.
4. Peer review by engineering associate.
5. Meetings and final report.

I have included an allowance for a peer review to have a second opinion on the upgrading requirements. As discovered in our meeting, dealing with the seismic problem is quite a complex issue. Because we are looking for a long-term solution I think it is wise to use all the available resources we have at this time. I will also be seeking the opinion of local contractor(s) to assist in looking at some of the difficult construction aspects of the upgrading such as temporary support of the building for block wall removal, rock excavation and anchorage and retrofitting seismic anchors and bracing.

Fees

My proposed fee for the services 1 to 5 are $3600 plus G.S.T.

Task	Time	Fee
1. Analyze/upgrade	8hrs	$400
2. Costs A	24hrs	$1200
3. Part B	16hrs	$800
4. Peer review	L.S.	$600
5. Meetings and final report	12hrs	$600
Total Fees		$3600

I trust the following meets your needs at this time. Please call me at 335-1192 if you have any questions or require further information.

Yours truly,

Ron McMurtrie, P.Eng.

Hornby Island Fire Department
3850 Central Road
Hornby Island, BC
V0R 1Z0

COST ANALYSIS AND ESTIMATED PERFORMANCE OF SIESMIC UPGRADING – HORNBY ISLAND FIREHALL BUILDING

Prepared by,
Ron McMurtrie, P.Eng.

May 2, 2001

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May 2, 2001

Hornby Island Fire Department
3850 Central Road
Hornby Island BC
V0R1Z0

ATTENTION: MR. GIFFORD LA ROSE, FIRE CHIEF
RE: COST ANALYSIS AND PERFORMANCE OF SEISMIC UPGRADING – HORNBY FIREHALL BUILDING

Dear Sir:

Attached is my report summarizing the findings regarding the estimated costs and performance for upgrading the existing firehall building as per my proposal of November 27, 2000.

I look forward to discussing these findings in further detail with you and the firehall committee to determine a course of action for the future of the Hornby Island Fire Department and its emergency preparedness program.

If you have any questions please do not hesitate to call me at 335-1192.

Yours truly,

PROFESSIONAL ENGINEER PROVINCE OF BRITISH COLUMBIA R. J. McMurtrie May 2, 2001

Ron McMurtrie, P.Eng.

I. INTRODUCTION

Further to our meetings and discussions following my previous report "Preliminary Seismic Review – Existing Firehall Building" dated November 7, 2000 it was realized that further investigation and analysis would be required to determine to what extent and at what cost the existing firehall building could be upgraded for seismic loading. The recommended course of action was to remove Bays #3 and #4 and rebuild this portion to the latest seismic requirements of the BC Building Code and to look at a program of upgrading Bays #1 and #2 and the office and second floor areas. This report provides the following information: 1. An analysis of the existing structure and its estimated seismic performance versus the requirements of the 1998 BC Building Code; 2. Estimated costs versus Seismic Performance for 3 levels of upgrading of the existing building and; 3. Estimated costs for removing and re-building Bays #3 and #4 to the '98 Code.

II. ANALYSIS OF EXISTING STRUCTURE

A structural analysis of the existing building for seismic loading was performed as per the requirements of Part 4 of the 1998 BC Building Code. The analysis assumes that Bays #3 and #4 are removed and that future re-construction of Bays #3 and #4 will not be structurally connected to Bays #1 and #2 (i.e. a gap would separate the two such that lateral load transfer from one to the other would not occur).

The analysis is based on the building survey of the first report and a subsequent more detailed investigation of some of the structural components and connections. This second investigation involved cutting some holes in the floor and ceiling at wall to floor connections to be able to better evaluate the construction details of the building.

The results of the structural analysis are summarized in Table 1, which is included in the Appendix. Table 1 compares the estimated existing capacity of the various parts of the lateral force resisting system of the building with the loadings calculated as per the requirements of the '98 Code. The 3rd column of the table gives an estimate of the existing capacity expressed as a percent of the Code requirement.

To understand the significance of the figures in Table 1, one must have an understanding of how lateral seismic loads are resisted by the building. The loads at each storey are applied to the roof and floor diaphragms which act as plates or horizontal beams. The loads are then transmitted to the end walls or shearwalls which act as bracing or buttressing. These loads are further passed down through the storeys to the foundation via a system of members and connections. These connections consist of nailing, bolting and other anchorages. This route of load transfer from structure into foundation is called the load path. It is essentially a chain of interconnected elements that connects the building to its foundation. And like any chain it is only as strong as its weakest link or member. Hence any upgrading program must remove the weakest links to be truly effective.

The results of Table 1 are difficult to summarize in a few sentences. In general, some items and/or connections in the building have very low capacity of 0 to 30%

approximately. Others are averaged at about 50% and some components are estimated at 100% or up to the required seismic standard. However even if two elements are both at 100% but the connection between the two is only 25% then only 25% of the load will get transferred from one element to the next.

Essentially the results in Table 1 reflect numerically my comments in the previous report that the building has many weaknesses under conditions of seismic loading. Rather than getting too bogged down in analyzing Table 1 it will be more productive to see what effects upgrading can have on reducing and eliminating the weak links in the structure.

III. UPGRADING OPTIONS

I have looked at upgrading the building in 3 levels namely: Level 1; Level 2 and Level 3. This work could be done in stages or it could all be done all at once. The stages could include part of or all of the work described in each level. Obviously doing the work in stages has advantages. Costs can be spread out over a longer period and disruptions in firehall operation can be controlled or minimized.

The details of the work required for each level and the qualitative results are outlined below. Table 2 in the Appendix provides numerical quantitative results for the 3 levels of upgrading as a percentage of the 1998 Building Code requirements. By moving from 1 column to the next in Table 2 one can see the cumulative improvements made to the building.

In summary: **Level 1** deals mainly with two major weak links in the main floor shearwalls on Grids 4 and 2. **Level 2** completes the main floor shear walls and removal of the hollow masonry block from the building. **Level 3** deals with the second storey and upgrades the roof diaphragm, second floor shearwalls and second floor diaphragm.

1. Level 1 – Scope of Work

1.1 Splice roof diaphragm chords Grids 2 and 4.

1.2 New main floor shearwall and drag strut Grid 4, E to F

- Remove and replace canopies, C to F
- Remove siding, existing main floor retrofit shearwall and concrete curb, block wall, and second floor framing, sheathing, insulation and drywall E to F.
- Temporary support as required.
- Sidewalk removal and replacement as required.
- Drill and set rock anchors for uplift at E and F.
- Concrete piers, footing and anchorage for new shearwall
- New 2x6 plywood shearwall 12'x14' (insulate and drywall).
- Install structural steel collector strut (42' long) C to F. Bolt to 2nd floor diaphragm rim joist and new shearwall.

- Upgrade connection of 2nd floor wall to floor diaphragm and floor diaphragm connection to steel strut, C to F. Includes some removal and restoration of drywall ceiling and flooring along Grid 4.
- Reframe 2nd floor wall and move office window up, re-sheet, insulate and drywall, E to F.
- Replace siding E to F.
- Relocate door to Grid F (or other suitable location).
- Relocate main electrical service and meter.
- Electrical work as required (including temporary measures to keep operational during renovation).

1.3 New main floor shearwall Grid 2, C to E.

- Remove block wall (12'x28') and temporary support 2nd floor wall.
- Drill and set rock anchors for uplift at C and E.
- Concrete piers at C and E.
- Install new 2x6 plywood shearwall, anchor bolts and uplift anchors.
- Side and insulate 2x6 wall.
- Upgrade connection of 2nd floor wall to floor diaphragm and floor diaphragm to new shearwall. Includes some removal and restoration of flooring along Grid 2.

1.4 Splice and anchor at beam Grid D second floor joists.

- Cut and reinstate drywall ceiling along Grid D.
- Install framing anchors to joists and beam.
- Splice joist ends over beam with plates and/or nailing as required.

Results – Level 1:

- Minor improvement to roof diaphragm integrity.
- Eliminates major main floor weakness along Grid 4.
- Eliminates major main floor weakness along Grid 2.
- Eliminates major out-of-plan weakness on Grid 2 and potential danger from collapse of blocks and 2x4 wall.
- Prevents potential danger from collapse of 2nd floor at Grid D.
- Improves part of office wing and eliminates potential danger from collapse of blocks Grid 4, E to F.

(Refer to Table 2 for quantitative results)

2. Level 2 – Scope of Work

The removal of Bays #3 and #4 would be required prior to proceeding with item 2.1 below. The scope of work required for the reconstruction of Bays #3 and #4 is outlined in Section IV below.

2.1 New main floor bearing/shearwall Grid C, 2 to 4.

- Remove block wall 12'x40'

- Install new 2x6 plywood bearing shearwall, anchor bolts and uplift anchors.
- Insulate 2x6 wall (siding not required).
- Upgrade connection of 2nd floor wall to floor diaphragm and floor diaphragm to new shearwall.

2.2 New main floor bearing/shearwall Grid E, 2 to 4.

- Remove block wall 12'x40'.
- Temporarily suport 2nd floor of office.
- Remove 4' of office wall dry and replace (Grid E).
- Install new 2x6 plywood bearing shearwall, anchor bolts and uplift anchors.
- Upgrade connection of 2nd floor wall to floor diaphragm and floor diaphragm to new shearwall.
- Insulate and side 2x6 wall (2 to 3 only).
- Drywall and paint (Grid 3 to 4 only).
- Connect office 2nd floor to 2x6 wall.
- Electrical work as required (including temporary measures to keep operational during renovation).

2.3 Upgrade 2nd floor bearing/shearwall Grid E, 3 to 4.

- Remove drywall Grid 3 in office.
- Add horizontal blocking to existing wall.
- Splice top plate as required.
- Sheet and nail new plywood (from roof to floor).
- Replace drywall and paint.

2.4 Remove main floor office block walls and replace with 2x6 plywood shearwalls Grids 3 and F.

- Remove siding and existing retrofit stud walls (8'x34').
- Remove block walls and temporarily support 2nd floor.
- Remove and reinstate stairs as required.
- Install new 2x6 plywood walls, anchor bolts and uplift anchors.
- Upgrade connection of 2nd floor wall to floor diaphragm and floor diaphragm to new shearwalls.
- Side, insulate, drywall and paint 2x6 walls.
- Electrical work as required (including temporary measures to keep operational during renovation).

Results - Level 2:

- Completes integrity of main floor system.
- Reduces weight of structure (blocks all removed) and hence reduces seismic load on building.
- Improves main floor shearwalls Grid C and E and floor diapghragm connections to shearwalls.
- Improves main floor shearwalls in office.

- Eliminates major out-of-plan weakness on Grids C and E and potential danger from collapse of blocks and 2x4 walls.
- Eliminates potential danger from collapse of block walls Grids 3 and F.
- Improves 2nd floor shearwall Grid E.

(Refer to Table 2 for quantitative results)

3. Level 3 – Scope of Work

3.1 Upgrade Roof Diaphragm

- Remove metal roof and strapping.
- Remove asphalt shingles.
- Remove and replace perimeter plywood sheets and around hose tower.
- Upgrade connection to shearwalls (blocking and framing anchors and bracing at gable ends).
- Splice chords Grid C,E and F.
- Reinforce opening at hose tower.
- Re-nail plywood diaphragm to '98 Code.
- Install new roofing.

3.2 Upgrade 2nd Floor Shearwalls

- Remove siding and trim.
- Remove plywood.
- Reframe areas as required (possible removal and replacement of interior drywall).
- Anchor struts and headers.
- Install uplift anchorage.
- Install horizontal blocking (at plywood edges).
- Re-route electrical as required.
- Re-insulate as required.
- Re-apply plywood (some new sheets required) and nail to '98 Code.
- Install new siding and trims, flash and seal.

3.3 Upgrade 2nd Floor Diaphragm

- Remove flooring and cabinets etc to expose plywood.
- Remove and replace plywood and sheathing as required to reinforce diaphragm at hose tower. Add blocking and framing and anchorage.
- Nail plywood to '98 Code (nail through 2 layers of existing plywood and 1x8 diagonal sheathing into joists).
- Reinstate cabinets.
- Install new flooring.

Results - Level 3:

- Completes integrity of roof and 2nd floor wall system.
- Completes integrity of building as a whole.
- Improves roof diaphragm.
- Improves 2nd floor shearwalls and anchorage.

➢ Improves 2nd floor diaphragm.
(Refer to Table 2 for quantitative results)

IV RECONSTRUCTION OF BAYS #3 AND #4

The reconstruction of Bays #3 and #4 involves the taking down of the existing structure and the construction of a new building in its place. It is understood that the new building would be built to a single storey with the potential for addition of a second floor in the future. The design of the new building would have to take this into consideration from both a structural and architectural point of view. In order to make room for the new building (estimated at 35' wide x 48' long with 12' ceiling height) including an approximate 1ft. gap between existing and new structures and to have the slab elevation for Bays #3 and #4 to be the same blasting and removal of rock from the bank and beneath Bay #4 is required.

A wood frame building of 2x6 walls and 2x12 joists and plywood sheathing with a central beam of glulam or engineered wood with 2 steel columns is recommended for economy and open space. The building would be supported and securely anchored to a reinforced concrete foundation with a concrete floor slab. The ends of the building (garage doors) can be braced by the use of a structural steel "moment frame" consisting of I-beams and columns welded together and anchored to the foundation and bedrock.

Work associated with this part of the project is detailed below.

1. Removal of Existing Structure – Scope of Work

1.1 Remove weatherproof seal and flashing at Bay#3/#2 interface along Grid C.
1.2 Remove roofing.
1.3 Remove siding.
1.4 Remove garage doors.
1.5 Remove plywood.
1.6 Remove drywall and insulation.
1.7 Disconnect and remove electrical wiring and fixtures, plumbing and heating ducts.
1.8 Take down roof and wall framing lumber.
1.9 Salvage and store materials to be re-used in new construction.
1.10 Re-move from site and/or dispose of materials not to be re-used in new construction.

2. Slab/ Removal and Rock Blasting/Excavation – Scope of Work

2.1 Take down block walls (Grid A and B) and returns with excavator and remove backfill (Grid A).
2.2 Cut (jackhammer) slab along Grid C.
2.3 Remove slabs (Bays #3 and #4) with excavator..

2.4 Drill and blast rock to lower slab elevation of Bay #4 by 14" (make level with Bays #1,#2 and #3).
2.5 Drill and blast rock to cut bank back 4' to 6'. Cut slope to stable angle.
2.6 Stockpile on-site and/or remove materials from site.

3. Construction of New Structure to '98 Code – Scope of Work

3.1 Excavate, fill and compact as required to prepare for slab and foundation of new building.
3.2 Drill and set rock anchors for moment frames at garage door openings.
3.3 Pour foundation and slab.
3.4 Construct 1-storey 35'x48' wood frame building (stud and joist frame/plywood sheathing) with 12' ceiling height. Central beam (i.e. timber or glulam) with steel columns. Design building to accommodate future 2nd story. **Note:** New structure to be separated from existing structure. Connection between the two will be for weatherproofing, cosmetic and access purposes only.
3.5 Supply and erect structural steel moment frames (beams and columns) at garage door ends of building.
3.6 Roofing, insulation, drywall and exterior siding.
3.7 Doors, windows and doorways into Bay #2.
3.8 Electrical wiring and fixtures.
3.9 Plumbing.
3.10 Heating.
3.11 Foundation and site drainage.
3.12 Approach grading.

V ESTIMATED COSTS

Estimated costs for the work outlined in Sections III and IV above are summarized in Table 3 below. These figures should be considered for budgetary purposes only. Actual costs would be realized after construction is completed. There is considerable uncertainty associated with renovation costs. Typically a high to very high labour component is involved compared with new construction. Effort has been made to try and make sure that the budgets are adequate. Table 4 (see Appendix) is a detailed cost estimate for Bays #3 and #4.

Table 3 Cost Estimates

ITEM	ESTIMATED COST
1. Level 1 Upgrading	
1.1 Splice roof diaphragm chords Grids 2 and 4.	(included in 1.2)
1.2 New main floor shearwall and drag strut	$11,500

Grid 4, E to F	
1.3 New main floor shearwall Grid 2, C to E.	$7000
1.4 Splice and anchor at beam Grid D second floor joists.	$1500
Subtotal	$20,000
Contingency	$3000
Total Level 1 Upgrading	**$23,000**
2. Level 2 Upgrading	
2.1 New main floor bearing/shearwall Grid C, 2 to 4.	$5500
2.2 New main floor bearing/shearwall Grid E, 2 to 4.	$10,000
2.3 Upgrade 2nd floor bearing/shearwall Grid E, 3 to 4.	$3000
2.4 Remove main floor office block walls and replace with 2x6 plywood shearwalls Grids 3 and F.	$6000
Subtotal	$24,500
Contingency	$3000
Total Level 2 Upgrading	**$27,500**
3. Level 3 Upgrading	
3.1 Upgrade Roof Diaphragm	$8000
3.2 Upgrade 2nd Floor Shearwalls	$12,500
3.3 Upgrade 2nd Floor Diaphragm	$8000
Subtotal	$28,500
Contingency	$3000
Total Level 3 Upgrading	**$31,500**
Total Level 1,2,3 Upgrading	**$82,000**

Engineering @ 10%	$8000
Grand Total Upgrading Level 1,2 and 3	**$90,000**
4. New Bay#3 and #4 Structure	
4.1 Removal of Existing Structure	$3500
4.2 Slab/ Removal and Rock Blasting/Excavation –	$10,000
4.3 Construction of New Structure to '98 Code	$61,500
Subtotal	$75,000
Contingency @15%	$11,250
Architecture and Engineering @ 10%	$7500
Total Bays #3 and #4	**$94,000**
Grand Total Upgrading and New Construction	**$184,000**

VI SUMMARY AND RECOMMENDATIONS

As shown in Table 2, it is estimated that the upgrading of the existing building can reach levels approaching compliance with the 1998 BC Building Code requirements for seismic loading if all of the work in Levels 1, 2 and 3 is completed. As noted there is some degree of uncertainty regarding this because much of the existing building materials have not been observed by the author. However since much of the upgrading involves removing and exposing existing materials expected performance of the building can be re-evaluated during renovation. It is also noted that the work required to achieve this level of performance is costly and quite onerous. Considerable planning, coordination and management will be required to do the work and keep the firehall and its operations functioning at required levels.

It is recommended that the scope and costs of the work outlined in this report be compared with the cost and work involved in the construction of a new facility for the Fire Department and to compare what the end results will be. A big question to be answered is: Will the upgrading of the existing building and reconstruction of Bays #3

and #4 result in a facility that meets the needs of the Island and its residents well into the future?

From a structural engineering, life safety and emergency preparedness perspective the construction of a new facility to the full Building Code requirement can be done with greater surety than to upgrade the existing building. However the findings of this study show that a fairly high degree of seismic resistance can be achieved through a renovation process. The probability of collapse associated with the existing building is greater than that associated with a new building.

I would be pleased to discuss this further with the firehall committee and to assist in the decision making process. I am also prepared to help develop costs for new construction to compare with the upgrade costs if needed.

I trust this report meets your needs at this time and I look forward to our meeting.

VII APPENDIX

Table 1 Existing Capacity versus 1998 Building Code Requirements for Seismic Loading.

Item	Estimated Existing Capacity	'98 Code Loads	% of '98 Code	Location/ Notes
A. Main Building Bays #1 and #2				
1. Roof Diaphragm				
1.1 Shear	130 plf	380 plf	34 %	Grid 2 governs
1.2 Chords	6000 lb	2600 lb	100 %	Grid C,E govern
1.3 Chord Splice	1000 lb 200 lb	2600 lb 1200 lb	38 % 17 %	Grid C,E Grid 2,4
1.4 Shearwall Connection	50 plf 80 plf	170 plf 260 plf	29 % 31 %	Grid C,E Grid 2,4
1.5 Reinforcing at Tower	-	-	25%	Estimate
2. Floor Diaphragm				
2.1 Shear	110 plf	270 plf	41 %	Grid 2 governs
2.2 Chords	6000 lb	1800 lb	100 %	Grid C,E governs
2.3 Chord Splice	1000 lb 250 lb	1800 lb 500 lb	56 % 50 %	Grid C,E Grid 2,4
2.4 Shearwall Connection	160 plf 160 plf 50 plf	270 plf 630 plf 470 plf	59 % 25 % 11 %	Grid C Grid E Grid 2,4
2.5 Reinforcing at Tower	-	-	25%	Estimate
3. 2nd Floor Shearwalls				
3.1 Shear	90 plf 90 plf 90 plf 90 plf	275 plf 650 plf 275 plf 500 plf	33 % 14 % 33 % 18 %	Grid C Grid E (no plywood 3 to 4) Grid 2 Grid 4 (at windows)
3.2 Anchorage at 2nd Floor	160 plf 160 plf 160 plf 160 plf	290 plf 690 plf 290 plf 290 plf	55 % 23 % 55 % 55 %	Grid C Grid E (2 to 3) Grid 2 Grid 4
3.3 Uplift Anchorage	- 0 lb 0 lb 0 lb	- 3600 lb 2300 lb 2000 lb	100 % 0 % 0 % 0 %	Grid C Grid E (2 to 3) Grid 2 (at ends) Grid 4 (at windows)
3.4 Drag Strut/Anchorage	500 lb 500 lb	2250 lb 900 lb	22 % 56 %	Grid C Grid 4

	500 lb	4300 lb	12 %	Grid E
4. Main Ffloor Shearwalls				
4.1 Shear	300 plf 300 plf 300 plf 150 plf	370 plf 535 plf 500 plf 1200 plf	81 % 56 % 60 % 13 %	Grid C Grid E Grid 2 Grid 4 (E to F)
4.2 Anchorage at Slab	250 plf 250 plf 250 plf 250 plf	370 plf 535 plf 500 plf 1200 plf	68 % 47 % 50 % 21%	Grid C Grid E Grid 2 Grid 4 (E to F)
4.3 Uplift Anchorage	0 lb 0 lb 0 lb 0 lb 0 lb 0 lb	2000 lb 3600 lb 5200 lb 8800 lb 8000 lb 15000 lb	0 % 0 % 0 % 0 % 0 % 0 %	Grid C Grid E Grid E Grid E Grid 2 Grid 4 (E & F)
4.4 Drag Strut/Anchorage	>540 lb >540 lb 2000 lb	540 lb 540 lb 13000 lb	100 % 100 % 15 %	Grid C Grid E Grid 4
5. 2nd Floor Out-of-plane Wall Forces and Anchorage				
5.1 Bending	-	-	100 %	Assumed
5.2 Bending and Axial	-	-	100 %	Assumed
5.3 Anchorage	-	-	100 %	Assumed
6. Main Floor Out-of-plane Wall Forces and Anchorage				
6.1 Bending	700 ft-lb	1100 ft-lb	64 %	Grid 2,C,E
6.2 Bending and Axial	-	-	37 %	Grid C,E
6.3 Anchorage to Slab	150 plf	270 plf	56 %	Grid 2,C,E
6.4 Anchorage 2nd floor	200 plf -	270 plf 270 plf	74 % 10 %	Grid C,E Grid 2
7. Slab/Foundation				
7.1Reinforcing/ Integrity	-	-	-	Reinforcing assumed not to '98 Code

7.2 Uplift Resistance	-	-	-	Inadequate at some required anchorage points (2C,2E,4E,4F).
7.3 Bearing Capacity	-	-	-	Inadequate at some point loads from overturning moments(2C,2E,4E, 4F).
7.3 Lateral Resistance	-	-	-	Inadequately anchored at some shearwall locations(4,E to F).
B. Office Wing Addition				
1. Roof Diaphragm				
1.1 Shear	130 plf	140 plf	93 %	
1.2 Chords	6000 lb	680 lb	100 %	
1.3 Chord Splice	300 lb >340 lb	680 lb 340 lb	44 % 100 %	Grid E,F Grid 3,4
1.4 Shearwall Connection	50 plf 80 plf	100 plf 140 plf	50 % 57 %	Grid E,F Grid 3,4
2. Floor Diaphragm				
2.1 Shear	100 plf	130 plf	77 %	Grid E
2.2 Chords	-	360 lb	50%	at stairwell
2.3 Shearwall connection	-	-	30%	Assumed
3. 2nd Floor Shearwalls				
3.1 Shear	90 plf 90 plf 90 plf 30 plf	270 plf 160 plf 200 plf 200 plf	33 % 56 % 46 % 15 %	Grid 4 Grid 3 Grid F Grid E (no plywood)
3.2 Anchorage at 2nd Floor	160 plf 160 plf 160 plf 160 plf	160 plf 160 plf 115 plf 115 plf	100 % 100 % 100 % 100 %	Grid 4 Grid 3 Grid F Grid E
3.3 Uplift anchorage	0 lb 0 lb 0 lb 0 lb	1000 lb 1000 lb 0 lb 0 lb	0 % 0 % 100 % 100 %	Grid 4 Grid 3 Grid F Grid E
3.4 Drag Strut/Anchorage	-	-	50 %	Assumed
4. Main floor Shearwalls				
4.1 Shear	150 plf 90 plf	1200 plf 250 plf	13 % 36 %	Grid 4 Grid 3

	90 plf 0 plf	200 plf 65 plf	45 % 0 %	Grid F Grid E (ledger on block)
4.2 Anchorage to Slab	250 plf 125 plf 125 plf 0 plf	1200 plf 250 plf 200 plf 80 plf	21 % 50 % 63 % 0 %	Grid 4 Grid 3 Grid F Grid E
4.3 Uplift Anchorage	0 lb 0 lb 0 lb 0 lb	15000 lb 2800 lb 500 lb 0 lb	0 % 0 % 0 % 100 %	Grid 4 Grid 3 Grid F Grid E
4.4 Drag Strut/Anchorage	-	-	50 %	assumed
5. 2nd Floor Out-of-plane Wall Forces and Anchorage				
5.1 Bending	-	-	100 %	Assumed
5.2 Bending and Axial	-	-	100 %	Assumed
5.3 Anchorage	-	-	75 %	Assumed
6. Main Floor Out-of-plane Wall Forces and Anchorage				
6.1 Bending	700 ft-lb	500 ft-lb	100 %	Grid 3,F
6.2 Bending and Axial	-	-	75 %	Grid F
6.3 Anchorage to Slab	150 plf	270 plf	56 %	assumed
6.4 Anchorage 2nd floor	150 plf	270 plf	56 %	Grid F

Table 2 Seismic Performance vs Level of Upgrading[1]

Item	Exist	Level 1	Level 2	Level 3	Location/Notes
A. Main Building Bays #1 and #2					
1. Roof Diaphragm					
1.1 Shear	34 %	34 %	37 %[2]	100 %	Grid 2 governs
1.2 Chords	100 %	100 %	100 %	100 %	Grid C,E govern
1.3 Chord Splice	38 % 17 %	38 % 100 %	38 % 100 %	100 % 100 %	Grid C,E Grid 2,4
1.4 Shearwall Connection	29 % 31 %	29 % 31 %	29 % 31 %	100 % 100 %	Grid C,E Grid 2,4
1.5 Reinforcing at Tower	25%	25%	25%	100 %	
2. Floor Diaphragm					
2.1 Shear	41 %	41 %	80 %[2]	90 %	Grid 2 governs
2.2 Chords	100 %	100 %	100 %	100 %	Grid C,E governs
2.3 Chord Splice	56 % 50 %	56 % 100 %	100 % 100 %	100 % 100 %	Grid C,E Grid 2,4
2.4 Shearwall Connection	59 % 25 % 11 %	59 % 25 % 100 %	100 % 100 % 100 %	100 % 100 % 100 %	Grid C Grid E Grid 2,4
2.5 Reinforcing at Tower	25%	25%	25%	100 %	Estimate
3. 2nd Floor Shearwalls					
3.1 Shear	33 % 14 % 33 % 18 %	33 % 14 % 33 % 33 %	33 % 60 % 33 % 33 %	100 % 100 % 100 % 100 %	Grid C Grid E Grid 2 Grid 4 (at windows)
3.2 Anchorage at 2nd Floor	55 % 23 % 55 % 55 %	55 % 23 % 100 % 100 %	100 % 100 % 100 % 100 %	100 % 100 % 100 % 100 %	Grid C Grid E Grid 2 Grid 4
3.3 Uplift Anchorage	100 % 0 % 0 % 0 %	100 % 0 % 0 % 0 %	100 % 100 % 0 % 0 %	100 % 100 % 100 % 80 %	Grid C Grid E Grid 2 (at ends) Grid 4 (at windows)
3.4 Drag	22 %	22 %	22 %	100 %	Grid C

Strut/Anchorage	56 % 12 %	56 % 12 %	56 % 12 %	100 % 100 %	Grid 4 Grid E
4. Main Ffloor Shearwalls					
4.1 Shear	81 % 56 % 60 % 13 %	81 % 56 % 100 % 100 %	100 % 100 % 100 % 100 %	100 % 100 % 100 % 100 %	Grid C Grid E Grid 2 Grid 4 (E to F)
4.2 Anchorage at Slab	68 % 47 % 50 % 21%	68 % 47 % 100 % 100 %	100 % 100 % 100 % 100 %	100 % 100 % 100 % 100 %	Grid C Grid E Grid 2 Grid 4 (E to F)
4.3 Uplift Anchorage	0 % 0 % 0 % 0 %	0 % 0 % 80 % 80 %	100 % 100 % 80 % 80 %	100 % 100 % 80 % 80 %	Grid C Grid E Grid 2 Grid 4 (E & F)
4.4 Drag Strut/Anchorage	100 % 100 % 15 %	100 % 100 % 80 %	100 % 100 % 80 %	100 % 100 % 80 %	Grid C Grid E Grid 4
5. 2nd Floor Out-of-plane Wall Forces and Anchorage					
5.1 Bending	100 %	100 %	100 %	100 %	Assumed
5.2 Bending and Axial	100 %	100 %	100 %	100 %	Assumed
5.3 Anchorage	100 %	100 %	100 %	100 %	Assumed
6. Main Floor Out-of-plane Wall Forces and Anchorage					
6.1 Bending	64 % 64 %	100 % 64 %	100 % 100 %	100 % 100 %	Grid 2, Grid C,E
6.2 Bending and Axial	37 %	37 %	100 %	100 %	Grid C,E
6.3 Anchorage to Slab	56 % 56 %	100 % 56 %	100 % 100 %	100 % 100 %	Grid 2, Grid C,E
6.4 Anchorage 2nd floor	74 % 10 %	74 % 75 %	100 % 75 %	100 % 75 %	Grid C,E Grid 2
7. Slab/Foundation					
7.1Reinforcing/ Integrity	-	-	-	-	Reinforcing assumed not to '98 Code

7.2 Uplift Resistance	-	80 %	80 %	80 %	2C,2E,4E,4F
7.3 Bearing Capacity	-	80 %	80 %	80 %	2C,2E,4E,4F
7.3 Lateral Resistance	-	80 %	80 %	80 %	Grid 4 (E to F).
B. Office Wing Addition					
1. Roof Diaphragm					
1.1 Shear	93 %	93 %	93 %	100 %	
1.2 Chords	100 %	100 %	100 %	100 %	
1.3 Chord Splice	44 % 44 % 100 %	44 % 44 % 100 %	100 % 44 % 100 %	100 % 100 % 100 %	Grid E Grid F Grid 3,4
1.4 Shearwall Connection	50 % 57 % 57 %	50 % 57 % 100 %	50 % 57 % 100 %	100 % 100 % 100 %	Grid E,F Grid 3 Grid 4
2. Floor Diaphragm					
2.1 Shear	77 %	77 %	100 %[2]	100 %	Grid E
2.2 Chords	50%	50%	50%	75%	at stairwell
2.3 Shearwall connection	30%	30%	80 %	80 %	
3. 2nd Floor Shearwalls					
3.1 Shear	33 % 56 % 46 % 15 %	100 % 56 % 46 % 15 %	100 % 56 % 46 % 100 %	100 % 100 % 100 % 100 %	Grid 4 Grid 3 Grid F Grid E
3.2 Anchorage at 2nd Floor	100 % 100 % 100 % 100 %	100 % 100 % 100 % 100 %	100 % 100 % 100 % 100 %	100 % 100 % 100 % 100 %	Grid 4 Grid 3 Grid F Grid E
3.3 Uplift anchorage	0 % 0 % 100 % 100 %	100 % 0 % 100 % 100 %	100 % 0 % 100 % 100 %	100 % 100 % 100 % 100 %	Grid 4 Grid 3 Grid F Grid E
3.4 Drag Strut/Anchorage	50 % 50 %	100 % 50 %	100 % 50 %	100 % 100 %	Grid 4 Grid F
4. Main floor Shearwalls					
4.1 Shear	13 % 36 % 45 % 0 %	100 % 36 % 45 % 0 %	100 % 100 % 100 % 100 %	100 % 100 % 100 % 100 %	Grid 4 Grid 3 Grid F Grid E
4.2 Anchorage to Slab	21 % 50 % 63 % 0 %	100 % 50 % 63 % 0 %	100 % 100 % 100 % 100 %	100 % 100 % 100 % 100 %	Grid 4 Grid 3 Grid F Grid E

4.3 Uplift Anchorage	0 % 0 % 0 % 100 %	100 % 0 % 0 % 100 %	100 % 100 % 100 % 100 %	100 % 100 % 100 % 100 %	Grid 4 Grid 3 Grid F Grid E
4.4 Drag Strut/Anchorage	50 %	50 %	100 %	100 %	
5. 2nd Floor Out-of-plane Wall Forces and Anchorage					
5.1 Bending	100 %	100 %	100 %	100 %	Assumed
5.2 Bending and Axial	100 %	100 %	100 %	100 %	Assumed
5.3 Anchorage	75 %	75 %	75 %	100 %	
6. Main Floor Out-of-plane Wall Forces and Anchorage					
6.1 Bending	100 %	100 %	100 %	100 %	Grid 3,F
6.2 Bending and Axial	75 %	75 %	100 %	100 %	Grid F
6.3 Anchorage to Slab	56 %	56 %	100 %	100 %	
6.4 Anchorage 2nd floor	56 %	56 %	100 %	100 %	Grid F

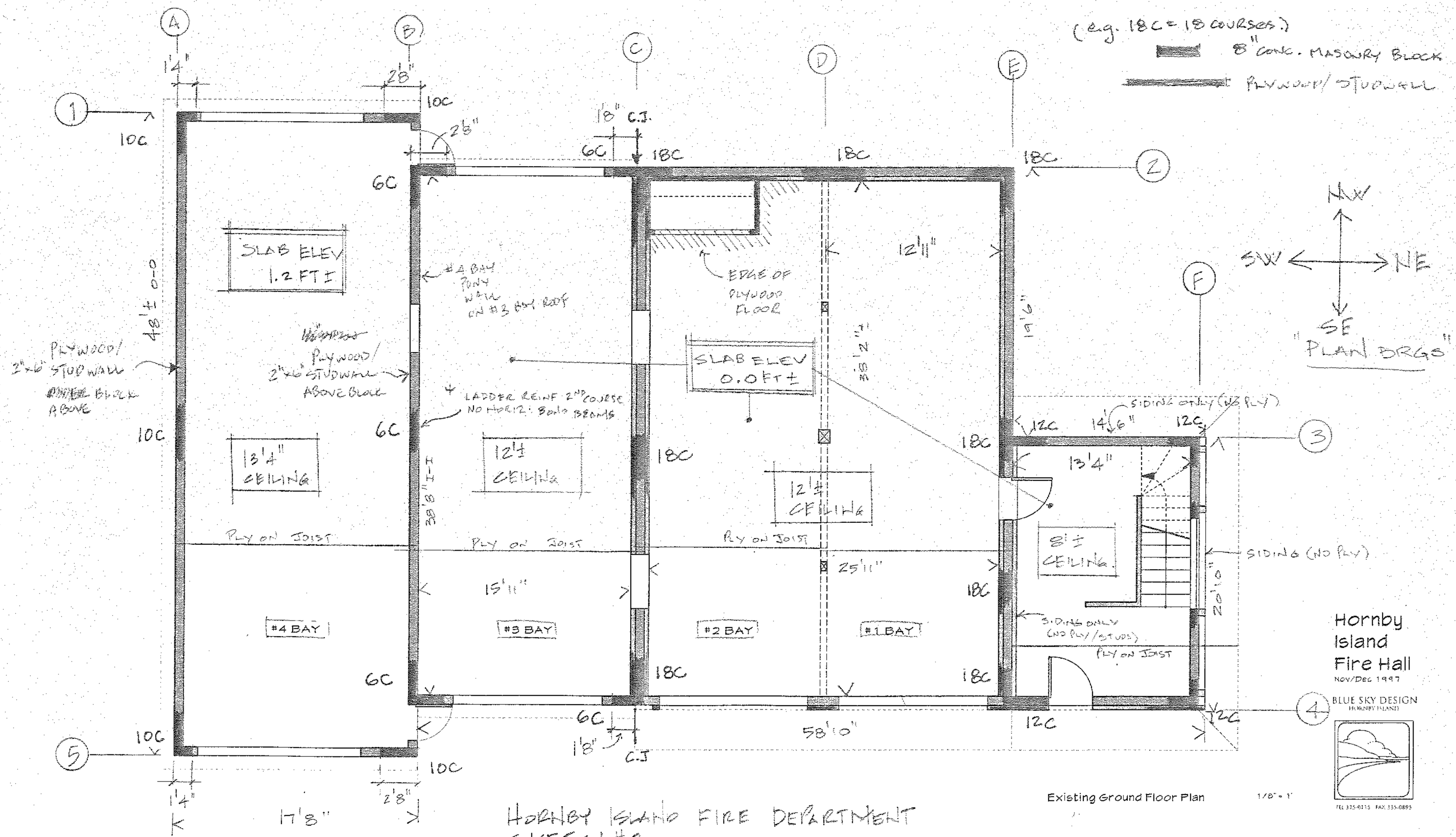
Notes to Table 2

1. **Values of percentage of Code requirements are estimates only and will require verification during construction of renovations. Hence these values are subject to change once actual conditions are uncovered.**

2. **Elimination of masonry block walls reduces load to floor diaphragm by 52 % and to roof diaphragm by 8 %.**

Table 4 **Detailed Cost Estimate for Removal and Reconstruction of Bays #3 and #4.**

Item	Unit	Quantity	Unit Cost	Estimated cost
Remove existing #3/#4	LS			3500
Blasting/slab removal	LS			10,000
Fill and compact	LS			1000
Rock anchors	LS			2500
Footings	cu.yd	8	250	2000
Slab	cu.yd.	25	250	6250
Column footings	cu.yd	5	275	1375
Foundation drains	LS			1000
Misc. site grading	LS			1000
Studwalls and plywood	sq.ft.	1500	3	4500
Roof beam and columns	LS			1000
Roof joists and plywood	sq.ft.	1850	4	7400
Structural steel frames	each	2	3000	6000
Roofing	sq.ft.	1850	1.5	2775
Siding	sq.ft.	1000	3	3000
Insulation walls	sq.ft.	1500	0.75	1125
Insulation roof	sq.ft.	1600	0.9	1440
Gyproc ceiling 2 @ 5/8"	sq.ft.	1600	3	4800
Gyproc walls @ 1/2"	sq.ft.	1500	1.5	2250
Garage doors	each	4	1000	4000
Doors and windows	LS			2000
Electrical	LS			2500
Plumbing	LS			1000
Heating	LS			1500
Painting	sq.ft.	3100	0.4	1240
Subtotal				**75155**
Contingency @ 15%				**11273.25**
Arch and Eng @10%				**7515.5**
Total Estimated Cost				**93943.75**

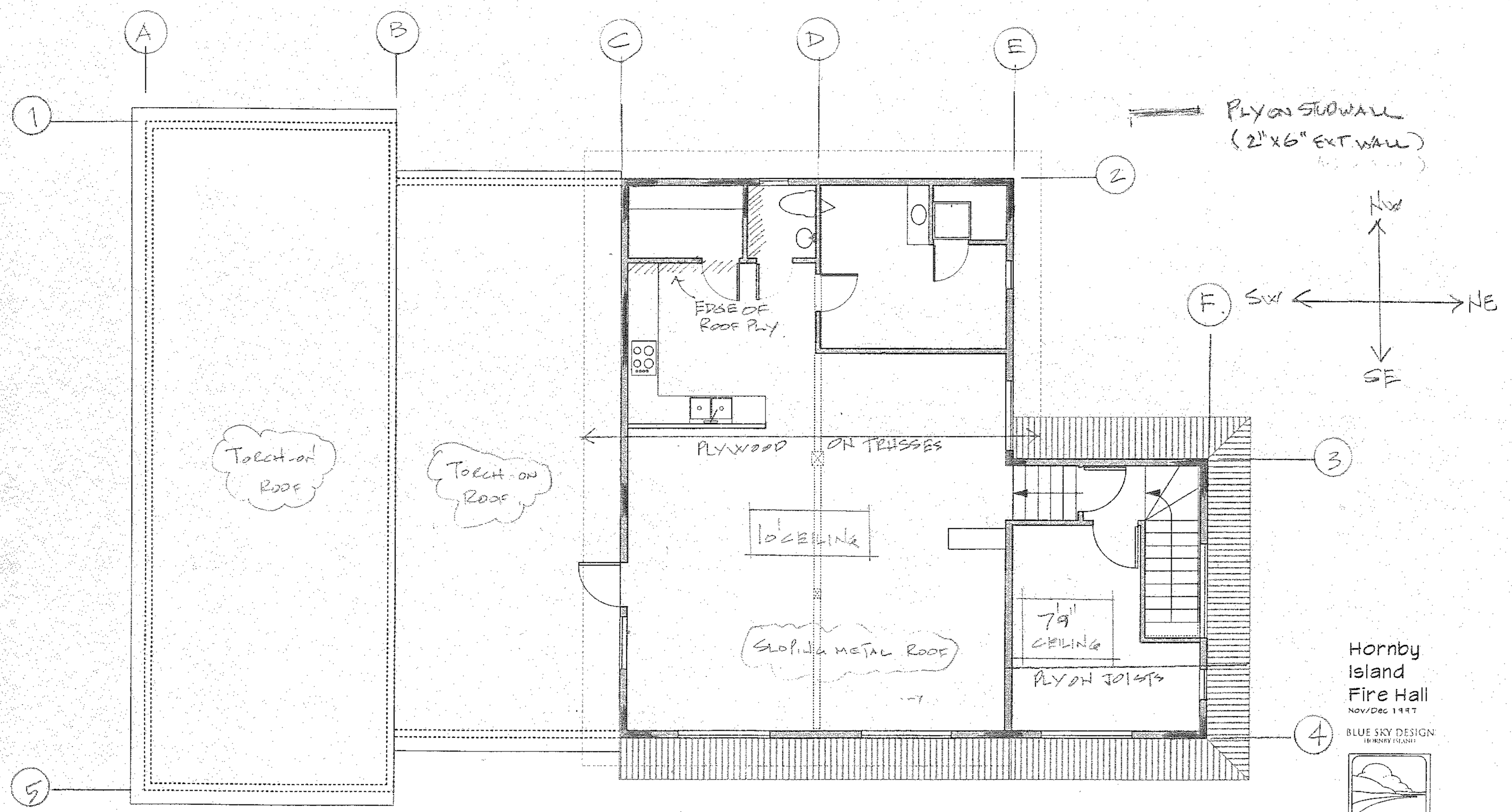


Hornby Island Fire Hall
Nov/Dec 1997
BLUE SKY DESIGN
HORNBY ISLAND
TEL 335-0115 FAX 335-0895

Existing Ground Floor Plan 1/8" = 1'

HORNBY ISLAND FIRE DEPARTMENT
SKETCH #2
BY: RM OCT. 19, 2000

PROJECT NO. 2000-03



Hornby Island Fire Hall
Nov/Dec 1997
BLUE SKY DESIGN
HORNBY ISLAND
TEL 335-0115 FAX 335-0895

Existing Upper Floor Plan 1/8" = 1'

RON McMURTRIE & ASSOCIATES
CONSULTING ENGINEERS

PROJECT NO. 2000-03

HORNBY ISLAND FIRE DEPT.
SKETCH #3
BY: RM OCT 19, 2000

HORNBY ISLAND FIRE DEPARTMENT
P.O. Box 28 Hornby Island B.C. V0R 1Z0 tel/fax (250) 335-2611

May 16, 2001

The Regional District of
Comox-Strathcona
350- 17th Street
Courtenay, B.C.
V9N 1Y4

Fax: 334-4358

Attention: Mr. Bruce Williams
Administrator
Re: Fire Hall seismic study

Dear Sir:

I am writing in follow up to a recent structural evaluation we have completed on the existing fire hall building. This evaluation was undertaken following concerns raised within the community and in particular, following a brief inspection by Claude Bedard of your Building Department, on December 9, 1999. The two reports, mentioned below, were based on an assumption that the firehall would be classified as a post disaster facility. There were of course also concerns within the community that our emergency vehicles might be damaged or inaccessible following an earthquake.

The Fire Department retained the services of a local structural engineer, Ron McMurtrie, P.Eng., who completed a preliminary survey on November 7, 2000. A copy of this report, titled "Preliminary Seismic Review Existing Firehall Building" is attached for your files. The report was reviewed by the H.I.R.R.A. Executive and Fire Department Committee, both of whom recommended additional investigation into remedial costs.

A second report was prepared by Ron McMurtrie on May 2, 2001, titled " Cost Analysis and Estimated Performance of Seismic Upgrading - Hornby Island Firehall Building". A copy of this report is also attached for your files.

I have spoken with Roxanna regarding the position of the Regional District with respect to the firehall building as the structure is owned by the District. We are starting on the process of reviewing the reports and available options, prior to reporting to the community. Our first meeting involving the executive, fire committee and HIFD officers, with Ron McMurtrie, will be on May 21st. This review process will include various options, ranging from 'do nothing' to 'fix it up' to 'sell and rebuild'. It is important to include the District in this process, however the question is, in what capacity?

I realize that Monday is a holiday and not very far off, but it would be very helpful if you might be able to indicate the possible role of the District in this process.

Yours truly,

Giff La Rose
Chief

D:\Fire Department\Administration\H I R R A\2001\Seismic\RDCS May 16, 2001.doc

HORNBY ISLAND RESIDENTS' & RATEPAYERS' ASSOCIATION

Notes of a Meeting, May 21, 2001 at 7:35 P.M. at the Firehall with members of the HIRRA Exec., Fire Protection Services/1st Responders Committee & Ron McMurtrie.
Purpose of the Meeting: Receive, review and comment on the report "Cost Analysis & Estimated Performance of Seismic Upgrading – H.I. Firehall Building."

Present: Giff LaRose, Fire Chief, Chairman; Fire Protection Services/1st Responders Committee members: Frank Elkins, Dale Chase, Bob Jeglum; HIRRA Executive members: Judith Lawrence, President; Sheila McDonnell, Secretary and Lu Ackerson, Treasurer; Volunteer Fire Fighters: Allen Derbyshire, Safety Officer; Parker McKenzie, Deputy Chief; Rob Zielinski, Captain, and Paula Courteau, 1st Responder Officer and
Janet LeBlancq, HIRRA Administrator.

The report was circulated to all present prior to this meeting and has been reviewed in depth by the Fire Protection Services/1st Responders Committee and the Officers.

Discussion Summary:

1. A copy of this report and covering letter has been submitted to RDCS Administrator, Bruce Williams.
2. The cost estimates in the report are based on a blend between island and off island rates of pay.
3. The ability of the tax base to meet the costs of capital improvements needs to be further explored with the RDCS.
4. The cost of upgrading the present building versus constructing a new Firehall in another location was discussed.
5. Flat land is preferred – the possibility of relocation of the Fire Hall complex to the HIRRA leased 10 acres between the Clinic and New Horizons was discussed.
6. The Quadra Firehall has received a Crownland site for locating its Firehall and the Chief there is doing research that could provide us with valuable information.
7. It is a generally accepted rule of thumb that major renovations cost more than the original estimate in that the scope of work changes during the process.
8. It would be very difficult for the Fire department personnel to maintain fire and 1st Responders services during a major renovation.
9. What is acceptable risk? We need RDCS input.
10. The Fire Protection Services/1st Responders Committee favors a new building over renovations. This was generally agreed to be the best option. The role of the committee was discussed.
11. An alternate source of funding through the gaming commission was mentioned.
12. We need a Community Vision – the Fire Protection Services/1st Responders Committee can facilitate this process.
13. The outcome of the Fire Truck purchase dilemma will impact the timing of future capital capabilities.
14. The executive will continue close liaison with the Fire Protection Services/1st Responders Committee.
15. The Fire Protection Services/1st Responders Committee meets the first Wednesday of the month at 7:30 P.M. at the Firehall.

Adjournment: The meeting adjourned at 9:20 P.M.

Giff LaRose, Chair

Janet LeBlancq, Recording Secretary

Hornby Island Residents' & Ratepayers' Association
Notes of a Special Meeting, 10 A.M. June 28th, 2001
at the Hornby Island Fire Hall

Present: Roxanna Mandryk, Area K Director; Bruce Williams, RDCS Administrator; Debra Oakman, RDCS Financial Manager; Don Marchand, RDCS Administration Officer; Andrew Carmichael, Vice President, HIRRA; Sheila McDonnell, Secretary, HIRRA; Lu Ackerson, Treasurer, HIRRA; Lynn Nunley, Chair, Fire Protection Services/1st Responders Committee; Frank Elkins, Bob Jeglum and Dale Chase, members, Fire Protection Services/1st Responders Committee; Giff LaRose, Fire Chief; Garth Millan, Training Officer/Volunteer Fire Fighter and Janet LeBlancq, HIRRA Administrator.

Purpose of Meeting: It was agreed by general consent that discussions would be:

1. Updating the process on events surrounding the obstacles to the purchase of the new pumper truck. Questions to be raised: What are the legal fees to date? What are the projected legal fees?
2. The McMurtrie engineering report on the structural strength of the fire hall complex vis a vis seismic activity.

Summary of Discussions:

Fire Truck Purchase:

Debra Oakman circulated a summary of events surrounding the purchase of the new pumper truck. It was noted that the legal issue is that of the sale of goods. Who has legal title to the pumper and truck chassis?

Legal fees incurred to date are $25,000, with a further $20,000 having been allocated. This $45,000 will be cost shared among MFA, MFA On Line Leasing, RDCS and Kootenay Boundary Regional District.

Lu Ackerson reported that a title search revealed that the truck chassis is registered but not the pumper. She noted a discrepancy in the serial numbers. Equipment identification is an issue.

No court dates are available until September 2001; the other avenue for settlement of this dispute is binding arbitration, where the arbitrator is a judge.

Can we tender for another truck now? Would this prejudice our case? Our present truck has 4 years left but must undergo a harsh pumper test annually due to its age. The test itself could prove lethal to the pumper. This is a concern.

More information is needed before a decision is made re court or arbitration to settle RDCS staff will arrange a meeting with representatives from MFA, RDCS and HIRRA.

2. Fire Hall Complex Structural Engineering Report:

The McMurtrie Report has been reviewed by all parties.

The options are a major renovation to the current complex or new construction on this or an alternate site.

It is necessary to determine RDCS & HIRRA liability in view of this report. The circumstances seem to indicate that there is no director's liability; RDCS staff will request a legal opinion on this issue.

The consensus reached at a recent meeting of the HIRRA executive with the Fire Committee and staff was to search out a better location and build a new fire hall complex. Who owns the land that sites the present Fire Hall? RDCS staff will check. (The RDCS owns the land). Giff is starting the Research process into possible sites and building design.

Roxanna explained the different ways of obtaining public approval for increasing the tax requisition for such an undertaking. The preferred method seems to be referendum – the next RDCS election is scheduled for the fall of 2002 – a referendum run concurrently would be a benefit economically. The referendum questions would need to include approval for increasing the tax requisition and authorizing RDCS to borrow funds. The referendum costs are covered under the Hornby Island Fire Protection Service. The referendum planning should be complete by early summer of 2002 to allow enough time for the RDCS to incorporate it into the fall election ballot process.

Accurate cost estimates for the new land and building must be available. RDCS staff will provide us with information re tax levies, interest on borrowing, etc.

The insurance coverage of the fire hall building and equipment will be reviewed in the upcoming RDCS/HIRRA service contract negotiations.

Adjourned at 12:45

_____

Janet LeBlancq
Administrator, HIRRA
July 3, 2001

APPENDICES

Fire Hall Building Committee

As a suggested starting point, the committee may consider the following points on which to base their exploration of this aspect of the new Fire Hall project:

Terms of Reference

1. The purpose of this committee is to investigate and report back to the H.I.R.R.A. Fire Committee and Executive on a recommendation for a new Fire Hall building
2. The committee will form a list of criteria on which to proceed with their investigation into fire hall design, for example:
   - number of bays
   - drive through or back to back parking
   - hose tower
   - high angle/fire training on the roof
   - one or two story
   - kitchen
   - shower/washroom(s)
   - training/conference room
   - office(s)
   - radio room/desk
   - maintenance area
   - indoor training facilities
   - caretaker residence
   - future expansion
   - exercise/weight room
   - PEP facility
   - backup power
3. The committee will liaise with the Land Committee to ensure basic compatibility of building configuration with the land parcels being considered:
   - long and narrow/short and wide
   - orientation to the sun
   - driveway access
4. The committee will:
   - Review fire hall designs from similar communities
   - Select at least three suitable building designs for comparison
   - Prepare basic sketches of each representative design
   - Prepare preliminary cost estimates for each design (±25% range)
   - Recommend the preferred design, including reasons for the choice
5. Report to a joint meeting of H.I.R.R.A. Fire Committee and Executive by _____

Fire Hall Land Committee

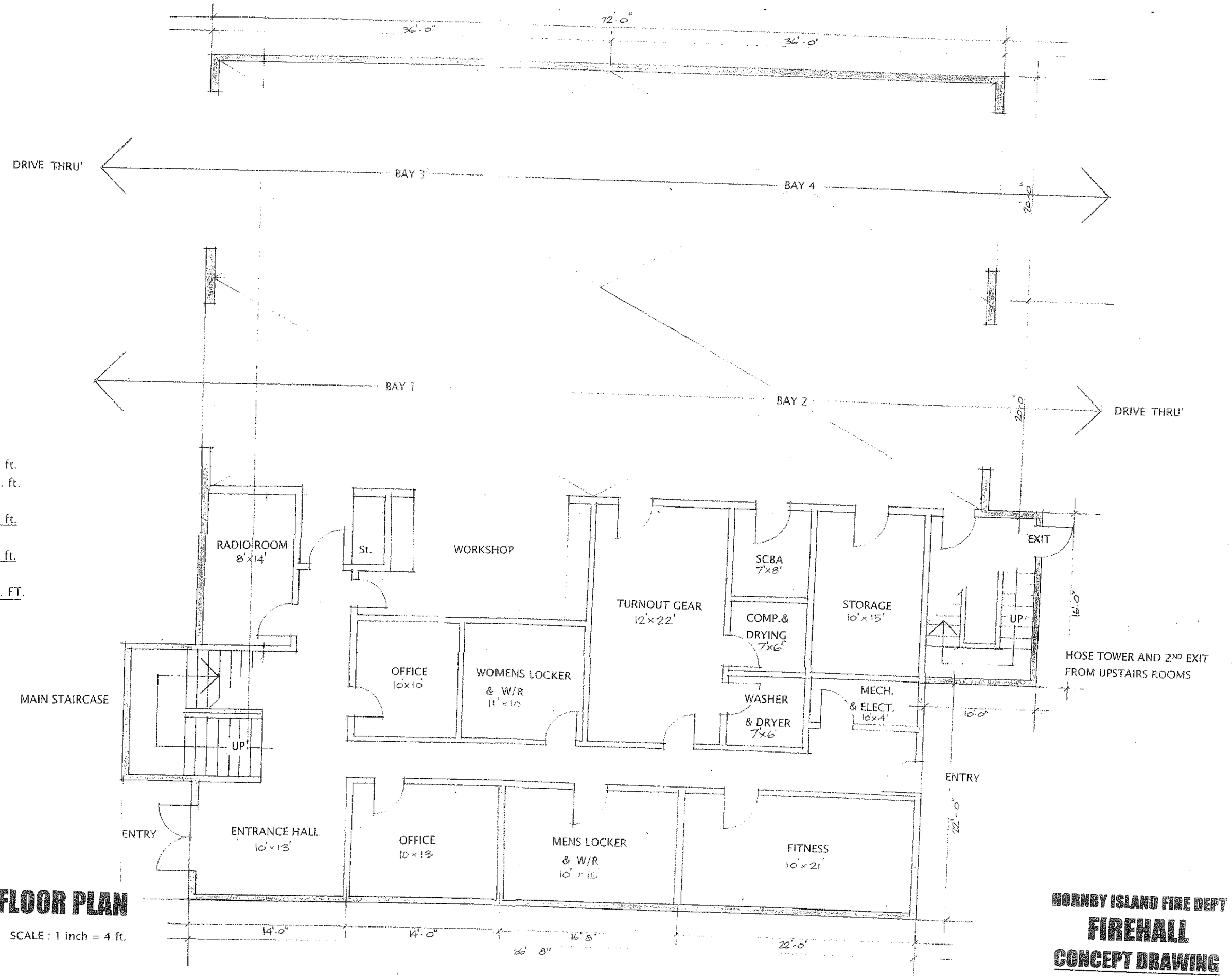
As a suggested starting point, the committee may consider the following points on which to base their exploration of this aspect of the new Fire Hall project:

Terms of Reference

1. The purpose of this committee is to investigate and report back to the H.I.R.R.A. Fire Committee and Executive on a recommendation for the location of a new Fire Hall building
2. The Committee will investigate the five parcels previously identified by the Fire Committee:
   - Crown land area which currently contains the Highways gravel pit
   - Crown land area immediately east of the cemetery
   - 10 acre crown land parcel currently leased by H.I.R.R.A.
   - Crown land below recycling depot (west side of entrance road)
   - Crown land parcel between Joe King and Community Hall
3. the committee will form a list of criteria on which to proceed with their investigation into the suitability of each parcel, which may include for example:
   - availability
   - lease/purchase via the Regional District
   - septic field suitability
   - ease of access
   - power service
   - drainage
   - zoning considerations
   - disturbance of (by) neighbours
   - merchantable timber
   - public visibility/access
   - radio tower considerations
   - size of area required/desirable
4. The committee will liaise with the Building Committee to address any special considerations with respect to possible building configuration and outside training area.
5. The committee will:
   - Prepare a comparison chart/spreadsheet for the criteria for the five parcels
   - Liaise with Crown Lands, Regional District, Islands Trust, Highways
   - Prepare basic sketches for each parcel, showing location, size, access, possible building site, potential septic field area, training area
   - Prepare preliminary cost estimates for each parcel, which shall include:
     i. clearing
     ii. driveway access
     iii. site preparation
     iv. electrical service
     v. well drilling/digging
     vi. parking area
     vii. paved apron(s)
     viii. training area
     ix. purchase/lease cost
   - Recommend the preferred parcel, including reasons for the choice
6. Report to a joint meeting of H.I.R.R.A. Fire Committee and Executive by _____

AREAS

4 bays @ 720 sq. ft.	2880 sq. ft.
Firehall	2720 sq. ft.
Ground floor total	5600 sq. ft.
Upper floor	2450 sq. ft.
TOTAL AREA.....	8050 SQ. FT.



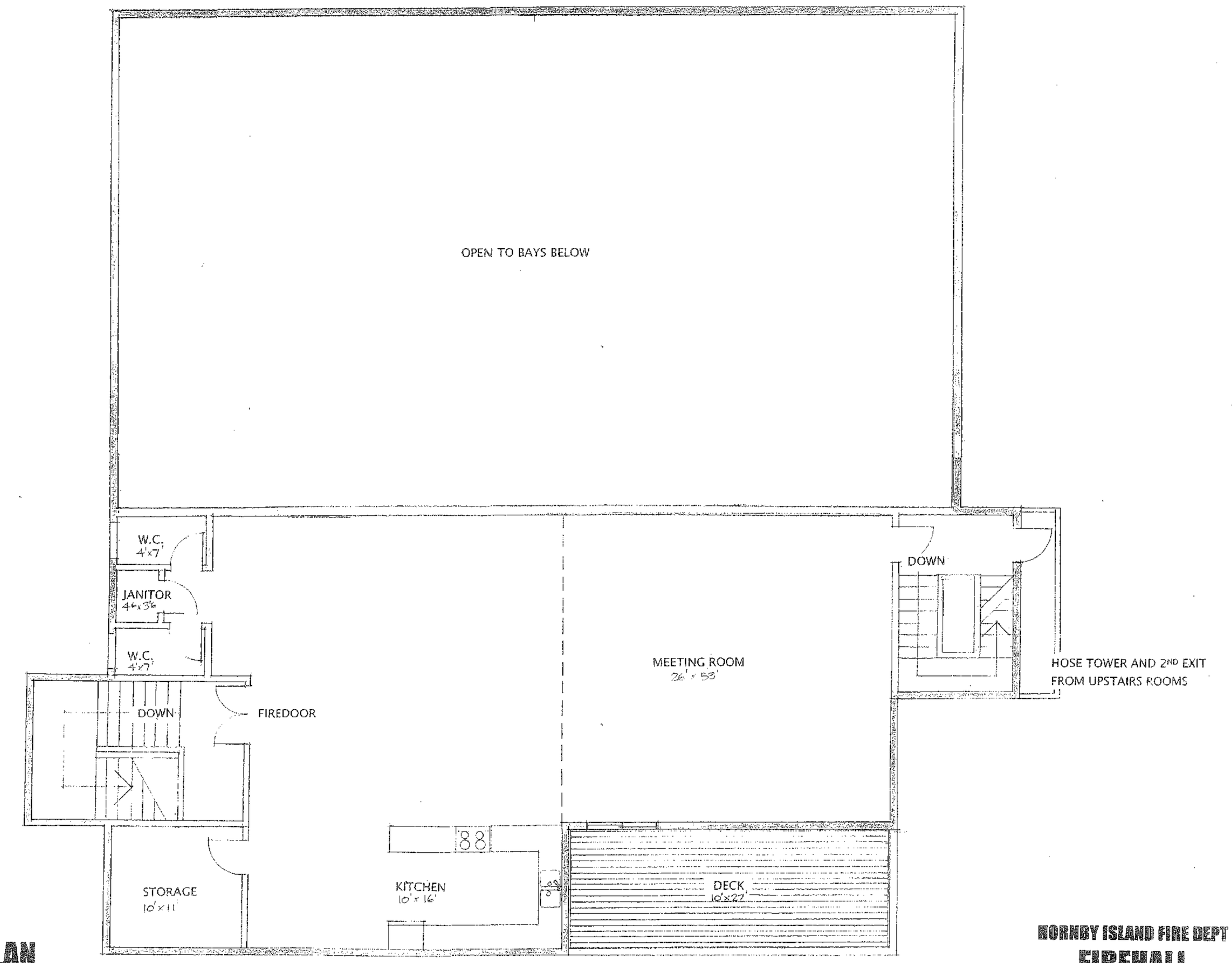
MAIN FLOOR PLAN

SCALE : 1 inch = 4 ft.

HORNBY ISLAND FIRE DEPT

FIREHALL

CONCEPT DRAWING



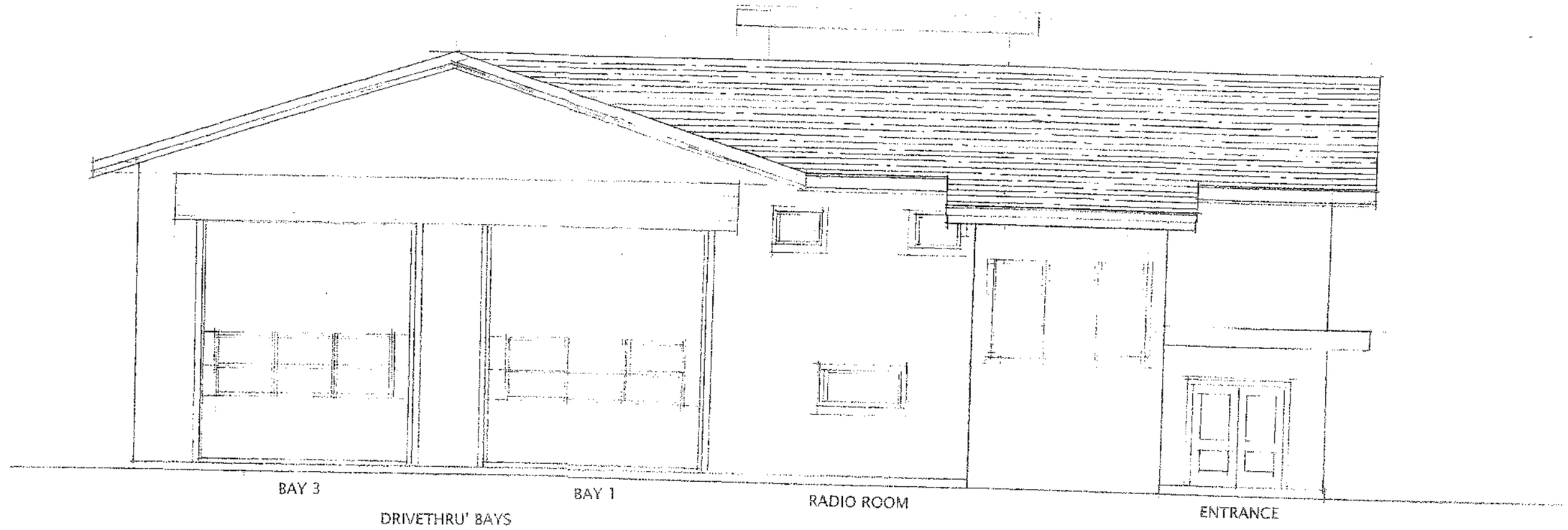
UPPER FLOOR PLAN

SCALE : 1 inch = 4 ft.

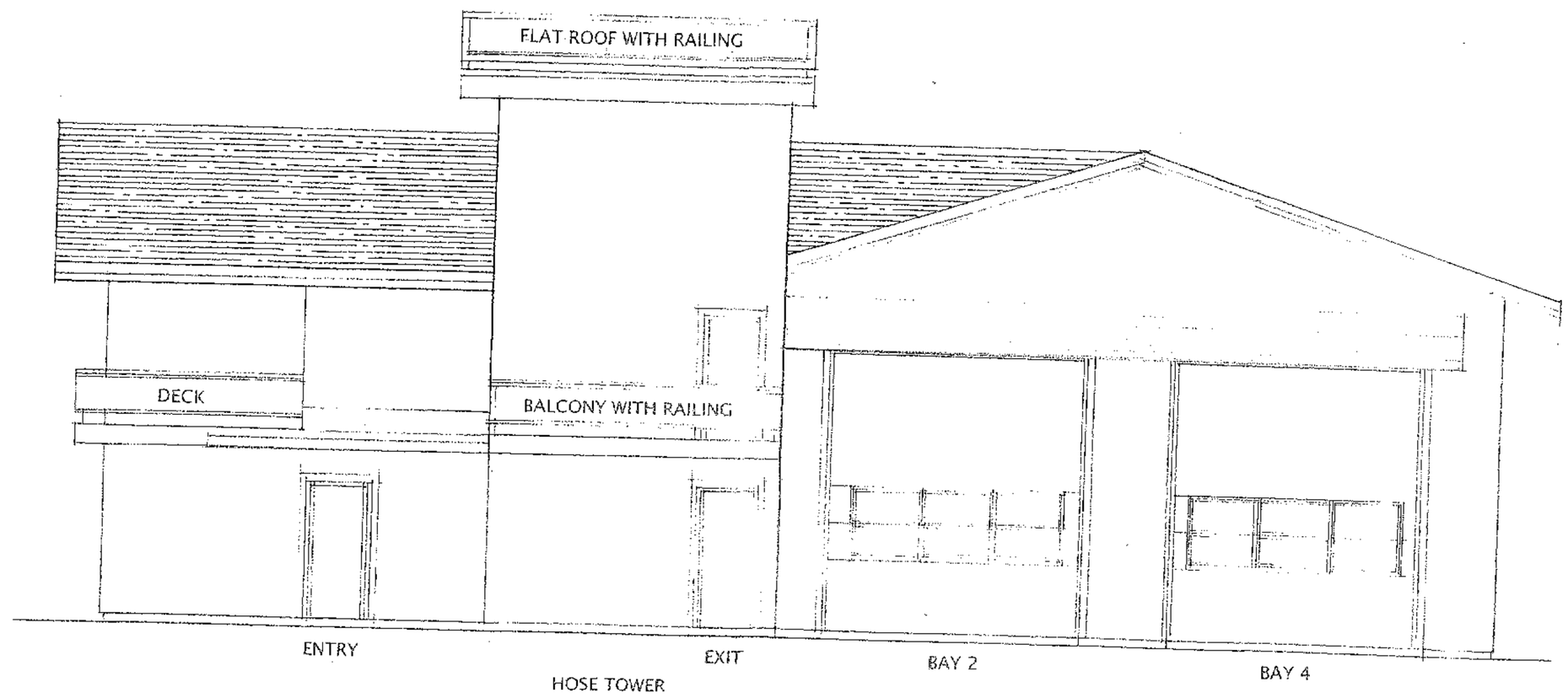
NORNBY ISLAND FIRE DEPT

FIREHALL

CONCEPT DRAWING



ELEVATION



ELEVATION

HORNBY ISLAND FIRE DEPT

FIREHALL

CONCEPT DRAWING

Giff La Rose

From: Alan Fletcher [fletcheralan@telus.net]
Sent: Sunday, June 29, 2003 9:13 PM
To: gifco@mars.ark.com
Subject: hornby fire hall .xls

PRELIMINARY
COST ANALYSIS

Project: Hornby Island fire hall

Date : june 6 2003

AREA	QUANTITY	UNIT	RATE	COST	COST/FL.AREA
SITE DEVELOPMENT					
excavation		100	$ 100.00	$ 10,000.00	
septic field				$ 28,000.00	
hydro				$ 10,000.00	
well drilled				$ 12,000.00	
SUBSTRUCTURE					
foundations	5600sqft.	sqft.	7.85/ft	$ 43,960.00	
STRUCTURE					
lowerfloor construction	5600sqft.		$ 3.12	$ 17,472.00	
upper floor construction	2450sqft		$ 12.18	$ 29,841.00	
stair construction	320sqft		$ 190.65	$ 60,800.00	
EXTERIOR ENCLOSURE					
walls above main	6400sqft		$ 14.72	$ 94,210.00	
windows	120sqft		$ 30.30	$ 3,636.00	
overhead doors		4	$3,600.00	$ 14,400.00	
exterior doors doors		6	$ 450.00	$ 2,700.00	
roof covering	9250sqft		5.00/ft	$ 83,250.00	
roof glazing					
projections					
PARTIONS AND DOORS					
fixed partions	10107sqft		6.53/sqft	$ 65,998.00	
interior doors		16	$ 400.00	$ 6,400.00	
interior glazing	100sqft		11/ft	$ 1,100.00	
INTERIOR FINISHES					
floor finishes	8050sqft		$ 2.50	$ 20,125.00	
ceiling finishes		8050	$ 2.25	$ 18,112.50	
wall finishes	18500sqft		$ 0.60	$ 11,100.00	
FITTINGS AND EQUIPMENT					
fixtures	8050sqft		$ 3.72	$ 30,000.00	
elevator		0	2stops	$ -	
MECHANICAL SYSTEMS					
plumbing and drainage	8050sqft		$ 6.25	$ 50,312.00	
fire protection	8050sqft		$ 1.75	$ 14,087.00	
HVAC	8050sqft		$ 9.67	$ 77,843.50	

controls	8050sqft		$ 1.48	$	11,953.00
ELECTRICAL SYSTEMS					
service and distribution	8050sqft		$ 5.55	$	44,677.50
lighting and heat	8050sqft		$ 7.60	$	61,180.00
emergency genarator	8050sqft		1unit	$	32,290.00

AREA	QUANTITY	UNIT	RATE	COST	COST/FL.AREA
OVERHEAD AND PROFIT					
site ovehads				$ 50,000.00	
office overhead and profit				$ 35,000.00	
CONSULTANT FEES					
desgn fees		10%			
management fees		4%			
OTHER EXPENSES					
air compressor					
kitchen appliances					
loose furnture					
cable Tv					
security system					
consruction contingency		3%			
GST*					
computer cable					
SUBTOTAL				$ 940,447.50	
GST				$ 65,831.00	
TOTAL				$ 1,006,278.50	

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WEB SITE : http://www.island.net/~pgeerwis/
Residence : Valley 2-7 Hornby Island British Columbia V0R 1Z0

July 4, 2001

Hornby Island Fire Department

Dear Mr LaRose

The Hornby Fire Hall is a mixed framed and cinder block structure built on a slab foundation , consisting of Two main levels, and three sectional components , with a short side facing the south, long and entrance sides to the east and west and a singular office ante room on the north side of the building. The lower level of cinder block the upper of standard 2 by 6 frame . Situated on 1.15 acres of leased land on Central Road,the location is somewhat considered the geographical centre of the island . The property on which the current structure stands is in the LI-2 Zone, Light Industrial 2.

Starting from the south and proceeding to the north side the building consists of

MAIN LEVEL

SECTION 1
A single bay of approximately 865 Square feet
with inside dimensions of 46' x 16' designated the #4 Bay

SECTION 2
A triplet of bays of approximately 1680 Square feet
A singular independent bay with inside dimensions of 37'x 15' designated the # 3 Bay
A double open set of bays with inside dimensions of 37'x 13' designated the # 2 Bay
A double open set of bays with inside dimensions of 37'x 13' designated the # 1 Bay

SECTION 3
An Ante and Store entrance room of 280 Square feet
with inside dimensions of 6' x 13' in an ante room
with inside dimensions of 12' x 13' in a bay entrance/storage

Ground Level Square footage 2825 Square feet

SECOND LEVEL

SECTION 2
Staff rooms of approximately 1080 Square feet
with inside dimensions of 22' x 27' in a conference , training room
with inside dimensions of 12' x 13' in a kitchen
with inside dimensions of 6' x 8 ' in storage tower hose entrance
a separate water closet with toilet and hand basin
a dressing and shower room with basin

SECTION 3
Office space of approximately 280 Square Feet
with inside dimensions of 9' x 15' and 4' x 6' in an office

Additionally there is an outside deck access of which is from the training room

Second level Square footage 1360 Square feet

TOTAL SQUARE FOOTAGE 4185 Square feet

The outside of the building is a mix of Board Batten and Shiplap cedar siding with some unfinished section on the second level adjacent to the #3 Bay . There is flat roof over the # 3 and # 4 Bays, with rolled roofing, and a cant roof with asphalt shingle roofing over the balance of the building. Windows in the upper level are a mix of Aluminium framed thermal double paned windows while those on the lower level are wood and aluminium framed single pane. There is electric base board heat along with a forced air oil heating system . The main bays are treated with regular fluorescent lighting , with emergency incandescent power packs. There are also yard lights. The building is alarmed with Price's Alarms in Courtenay . Installed work benches, particularly those with stainless steel surfacing will be removed .

The building is serviced with a flow through septic system, the tank to the outside of the building , the field on property across Central Road. It is not clear that the proper easement exists for the septic field, although the field lays on land owned by the Province. Water is obtained from a well that is located on land utilized by Main Roads Contracting , the old Highways Department facility,quality being somewhat sulphury as is the nature of most deep well installations on the island. There is no easement for the water. There is a drainage intercept system for building and yard water.

As mentioned the building is situated on a 2.07 acre parcel designated block C of the South 1/2 of the Northwest Quarter of Section 11 land District 32 Nanaimo. The effective dimensions being 250 feet deep with a 200 foot road frontage. The parcel is turned to the north west, with the building on the westerly part of the lot, the front portion of the building facing the balance of the lot that is used as a parking lot , exercise area, and the main exit area for the Department;s equipment, the "yard" as it were extended by use of a 66 foot right of way between the Fire Hall and The Main Roads Contracting Yard. The systems coordination for the units has been improved over the years, where by doors have been provided from both sides of the building, thus the return access is gained from a road way on the northwestern side of the lot along the 250 foot side, which utilizes part of the adjacent lot to the North .

The entire building is somewhat above the grade of Central Road, resulting in an upward access to both sides of the building. The area immediately to the north side of the building, the staff entry area has been tasteful terraced, and as volunteer Fire Department time goes and permits, it is apparent the Hornby Volunteer group utilize what time they can to improve the outward looks of the building when funds or materials or improving the building itself are not available.

The building would be classed industrial, in Real Estate Terms, and though constructed in stages is in fair condition, even though outside sections are not fully sided. The northern sections, the staff entry area appear to require attention to roofing. The office area is newly broad loomed and is cheery while the training and conference area is in good condition.

Based on local building costs and standards it could be estimated that a building of this type and quality could be constructed new for $50 per square foot. Replacement value therefore would be $209 250. Although Bay 4 is a relatively new addition in the past 5 years, most of the building has been constructed over a period of some 25 or more years, with the majority of the structure developed some 20 years ago. A depreciation factor of 25% is arbitrarily applied by this writer for age leaving the building value at $156 937 or $157 000 on a depreciated replacement cost value .

This analysis contains print out sheets for Active, Solds and Expired listings of the Vancouver Island Real Estate Board as of July 1- being ALL of Vancouver Island except that area under the jurisdiction of the Victoria Real Estate Board. The documents are appended. It is clear that a Competitive Market Analysis or CMA can only be used for relative numbers as the objects of attention are varied in quality and quality, and other than lease rates, also own the lands on which they are located

Active Listings

3527 Cowichan Lake Road Duncan on 1.03 acres contains industrial buildings with 5000 square feet of usable space, however at $289 900 also contains a three bedroom home. Only two other structures are available , one at Cassidy and one at Cameron lake,both on 3 acres of land and from the photos appear to be significantly newer and in better condition then the subject property, both listed in the range of $299 000 and $289 000 respectively . Attention should be paid to the fact that these are situated on their own land and not leased as in the Fire Department's case.

Sold Listings

The only sale in recent time being in 1999 of 2030 Boxwood Road in Nanaimo at $330 000, on a similar lot size of 0.75 acres the building was only 3 years old at the time , had paved parking and thus is of significantly higher value. Factoring building value, if at replacement cost of $209 250, the land value would be $120 750 in a significantly more active urban area . Hornby currently has one parcel available at $79 900 - unserviced. Servicing currently costs about $25 000 to $35 000 for septic and $5 000 for water. At the high end this would mean an acre on Hornby would cost $119 900. Although this analysis is somewhat broad, it does point to the likely range of value for the fire department on a newer basis.

Expired Listings

Normally an expired listing is indication of too high a price although many other factors such as timing of the owners decision, changing business environment and changes of mind do play a role in the withdrawal of property from the Market. Information on such factors for an individual property are often only the purvey of the listing agent . However in our analysis we see comparable buildings again at 222 Fry Street Nanaimo at $295 000 in 1998, a much younger building , 1852 Robinson Road Campbell River at $195 000 and 4747 Tebo Road in Port Alberni at $199 000 the latter the closest match to the Fire Hall ,in size and in type, yet much newer again on its own land. Note the Tebo property was brought on at $259 000 in 1997 as is repeated at the bottom of the pages provided

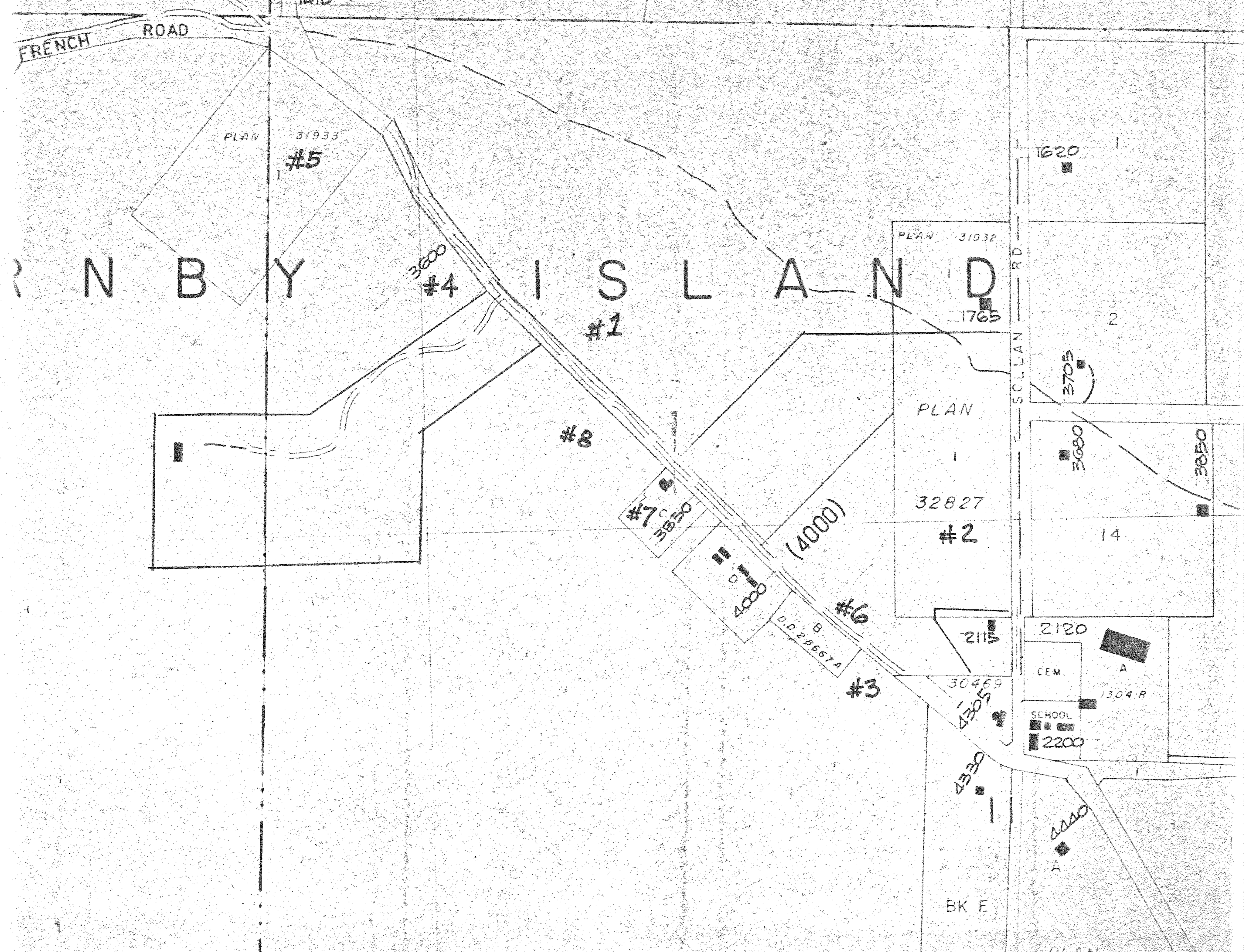
Fine tuning valuations can be a subjective process, and often in the presentation of a property to market, value is often taken by the purchaser on its eventual use. The Fire Department building, from our understanding does not meet current quake codes, and thus from a commercial insurance may be a difficult proposition. Additionally to this, the property on which it is situated is zoned PI-2, specifically addressing Public Service light industrial needs, thus if any other use were to be made, the process of re zoning through the public hearings system of the Islands Trust would be required. Therefore light industrial uses such as the potential for using the building for manufacturing, storage, transportation, automotive repair, although somewhat restricted by the fact that its location on Hornby could limit the markets of such issues, may not with the requirement of rezoning and adjustments for private business use under an insurance scheme, deter a potential opportunity from the private sector .

The question would remain as to what the lease value of the current property is and what impact that would have on the commercial or industrial viability of any enterprize (or residential) value in the building . This introspective analysis is, in the view of the writer completely up in the air however as outlined in the depreciated replacement cost analysis, and the adjustments for the lack of ownership of the specific property, it would be appropriate to conclude that the building contains a value of some $157 000 to $160 000.

If there are any questions please do not hesitate to ask the undersigned. I can be reached at 250-335-2482 at any time. Again I would like to thank you for the opportunity to be of service to the community, an apologize for the delay in time for which it has taken me to provide this to you.

Sincerely

R Gee
Sales Associate
Agent 9.15


FRENCH ROAD
PLAN 31933
#5
3600
#4
R N B Y I S L A N D
#1
PLAN 31932
1765
1620
1
2
SCLLAN RD.
3705
PLAN
1
#8
32827
#2
3680
3850
14
#7
3850
(4000)
4000
#6
B
D.D. 28667A
2115
2120
CEM.
A
1304 R
#3
30469
4305
SCHOOL
2200
4330
4440
A
BK E

REGIONAL DISTRICT

Comox-Strathcona

FAX

To:	Gif LaRose	**From:**	Don Marchand
Fax:	335-2811	**Pages:**	Two
Phone:		**Date:**	January 9, 2002
Re:	Firehall Site	**CC:**	[Click **here** and type name]
		Original to follow:	Yes ☐ No ☐

☐ **Urgent** ☐ **For Review** ☐ **Please Comment** ☐ **Please Reply** ☐ **Please Recycle**

● Comments:

Gif:

Finally received a reply from BCALC this morning and a copy of an Email received from Gordon Smaill is attached. I've also attached a copy of the map I sent him.

Have fun in locating a site and keep me posted.

Thanks

Don

Gif:
Couldn't get the fax to work so thought I'd drop this in the mail.

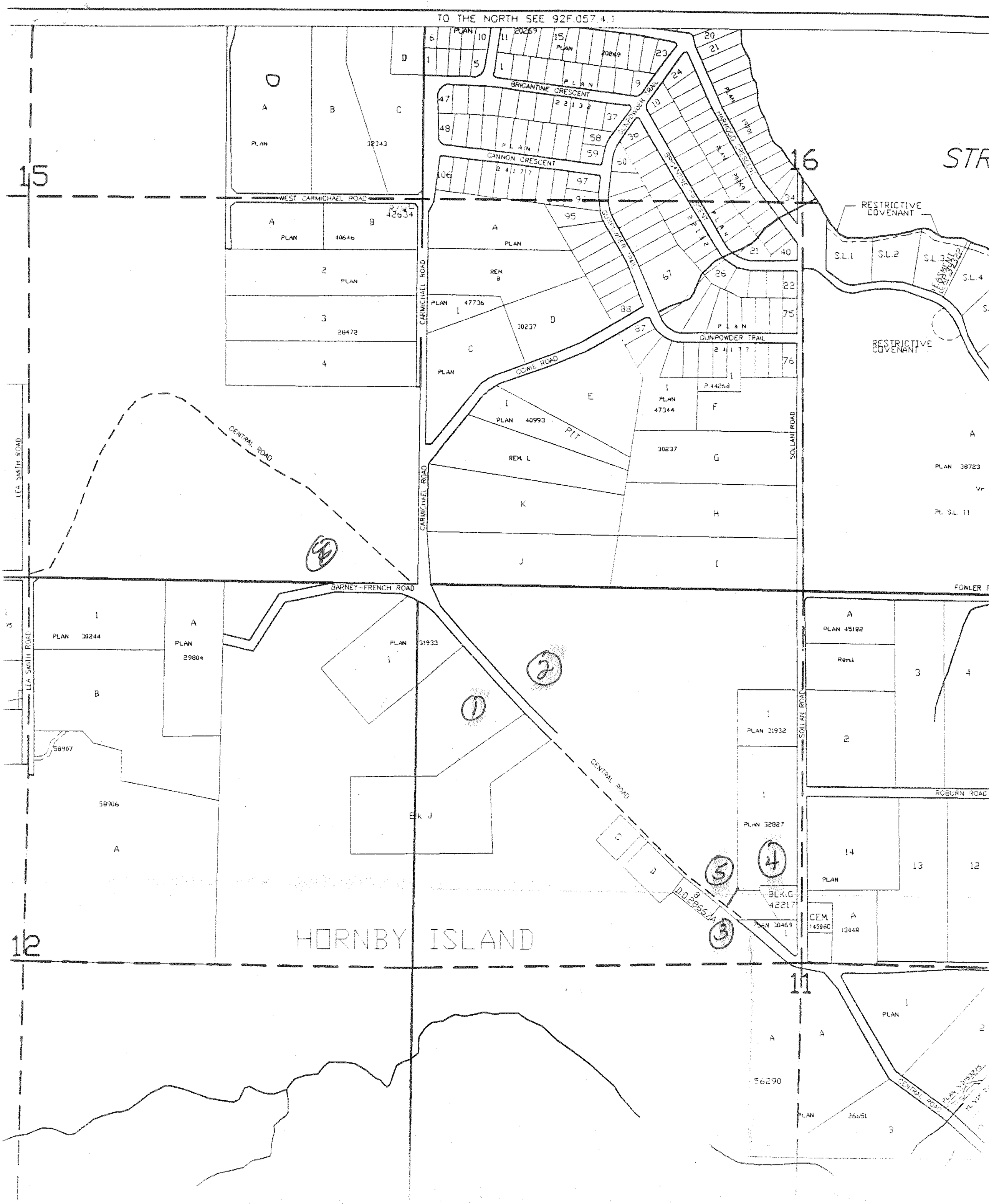
Don

350 – 17th Street, Courtenay, B.C. V9N 1Y4
Telephone (250) 334-6000 • Fax No. (250) 334-4358
TOLL FREE IN AREA CODE (250) 1-800-331-6007

Don Marchand @ RDCS

From: Smaill, Gord BCAL:EX [Gord.Smaill@gems4.gov.bc.ca]
Sent: Tuesday, January 08, 2002 4:15 PM
To: 'Don Marchand'
Subject: Hornby Island Firehall

Sites 3 and 5 are vacant and available for application however both sites would be near a potentially congested intersection. Site 4 is under license to the Ratepayers so they would have to amend their license by deleting firehall site so an application could be accepted. Site 2 is reserved to Highways for a gravel purposes. Not sure about site1 but why not locate firehall beside existing facilities on Block C? Cheers


TO THE NORTH SEE 92F.057.4.1
BRIGANTINE CRESCENT
GUNPOWDER TRAIL
CANNON CRESCENT
HARWOOD CRESCENT
WEST CARMICHAEL ROAD
CARMICHAEL ROAD
CONIE ROAD
PIT
CENTRAL ROAD
LEA SMITH ROAD
BARNEY-FRENCH ROAD
SOLLANI ROAD
FOWLER R
ROBURN ROAD
RESTRICTIVE COVENANT
EASEMENT
HORNBY ISLAND
15
16
12
11

HORNBY ISLAND FIRE DEPARTMENT
PO Box 28 Hornby Island BC V0R 1Z0 Tel: 250-335-2611 Fax:250-335-2611

May 31, 2002

Lands And Water BC Inc.
#501 - 345 Wallace Street
Nanaimo, B.C.
V9N 5B6

Attention: Mr. Mark Harvey

Re: Application for Crown Land Lease
Hornby Island Fire Department

Dear Sir:

The Fire Department is in the process of planning for the possible construction of a new fire hall to replace the existing facility, due to seismic inadequacies. I had previously spoken with Gordon Smaill regarding our interest in acquiring a suitable parcel of Crown land for this purpose.

I am enclosing two copies of a preliminary sketch showing the parcel in which we are interested and the possible layout of fire hall, training area and the extension of a parking area for the neighbouring Community Hall.

I note that I have indicated an inaccurate legal description on the plan and that the correct description should be:

Unsurveyed portion of the S1/2 of the NW 1/4 of Section 11
Hornby Island, Nanaimo District

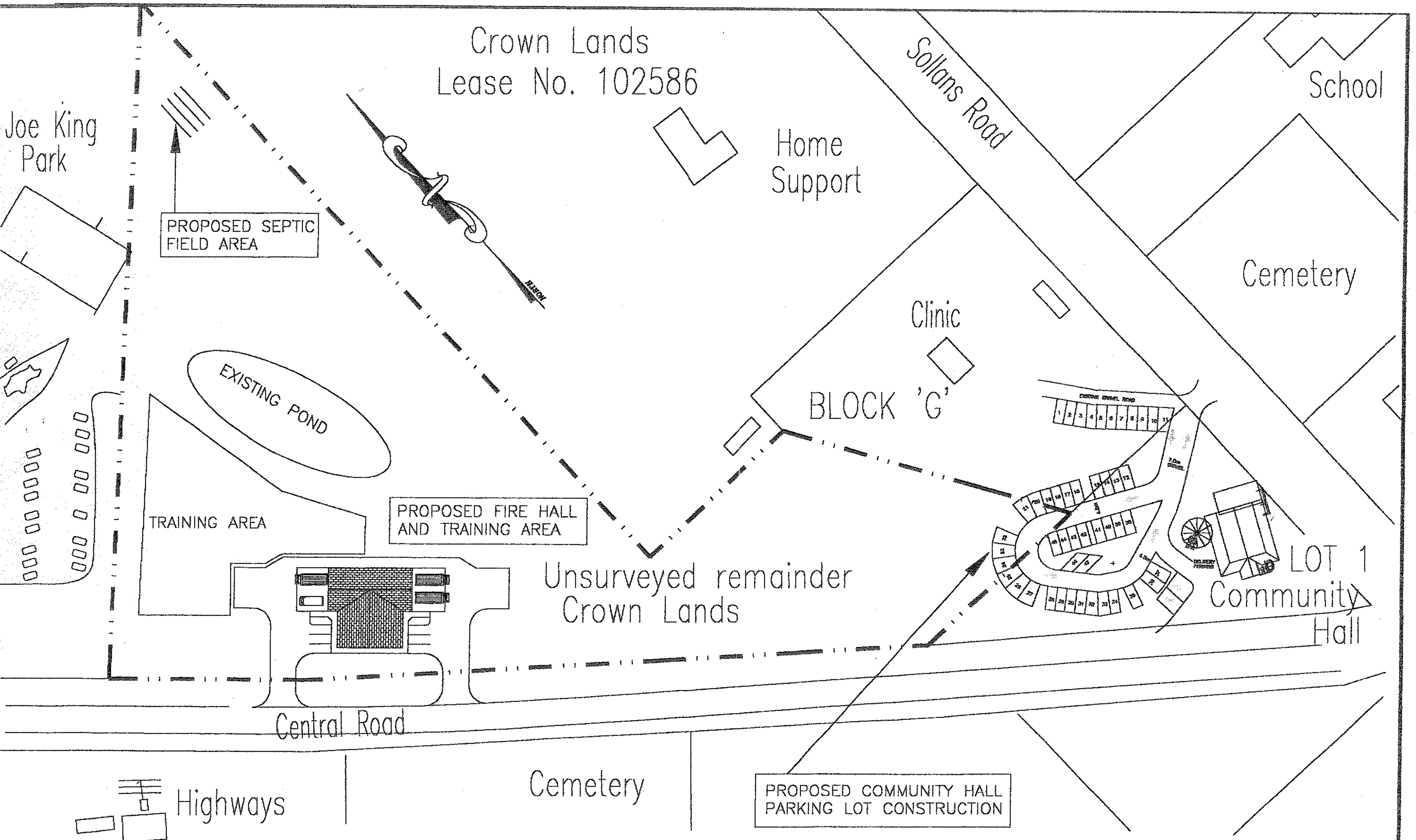
I would appreciate your assistance in starting the process of acquiring the parcel for the purpose of locating our new fire hall.

Respectfully

Gifford La Rose
Fire Chief

encls/

C:\Fire Department\FireHall Planning\2002\Lands and Water Bc May 31.doc



NO.	DATE	DESCRIPTION	BY

LEGAL DESCRIPTION:

UNSURVEYED PORTION
S.W. 1/4 OF SECTION 11
HORNBY ISLAND
NANAIMO DISTRICT

APPLICATION FOR CROWN LAND LEASE HORNBY ISLAND VOLUNTEER FIRE DEPARTMENT

DRAWING:	FIREHALL
DRAWN BY:	GLR
DATE:	MAY 27, 2002
SCALE: HOR. VER.	1:1000
REV.	

Land and Water
British Columbia Inc.
A corporation of the government of British Columbia

Rec'd
June 14/02

June 12, 2002

File: 11100-04

Gifford La Rose, Fire Chief
Hornby Island Fire Department
PO Box 28
Hornby Island BC V0R 1Z0

Dear Gifford La Rose:

Thank you for your letter dated May 31, 2002, advising that you wished to apply for a site to construct a new firehall since the existing building has seismic inadequacies and the site is too small for the firehall building, training area and parking.

I have reviewed your proposed site plan and question your need for this whole area given the improvements you propose. It appears that your use could be accommodated on a much smaller area freeing up part of the area for other potential future uses. What is the rationale for the proposed septic field being so far away from the firehall building?

Land and Water British Columbia Inc. (LWBC) has a responsibility to manage provincially owned Crown land for non-forest uses. This entails balancing the current needs from the public, local governments and community groups with the long-term needs from the public, etc. Crown land on Hornby Island has provided a basis for a large number of existing community activities. Land and Water British Columbia Inc. prefers that the existing community tenures be fully developed before we alienate additional vacant Crown land. It is noted that the Hornby Island Residents and Ratepayers' Association holds a ten acre lease on Lot 1, Plan 32827, which appears to be only partially developed. Is it possible that your proposed new firehall and associated activities could be accommodated on their lease?

.../2

Vancouver Island Service Centre: 501 - 345 Wallace Street Nanaimo BC V9R 5B6
Tel (250) 741-5650 Fax (250) 741-5686
Website: www.lwbc.bc.ca

A review of the Hornby Island Athletic Association's lease on the adjacent land indicates that they have fully developed their site and were considering some expansion into your proposed area. I note that your plan shows a possible expansion of the Community Hall parking into this area as well. This proposed parking expansion should be dealt with by the Community Hall Association and LWBC.

Land and Water British Columbia Inc. prefers that applications for community/local government uses should be in the name of the local government. If they are unwilling to be the formal applicant then they must provide a letter of support to the community group supporting the groups or agencies application. I am enclosing an application form for your use.

We require a top and side view of all buildings, to scale. See enclosed details of the development plan requirement. Please include in your plan the details of the expanded pond and filtration or settling ponds you mentioned in our telephone conversation, as well as the range of activities and materials to be used on your proposed training area.

What use is proposed of your existing firehall site should a new firehall site be developed? I understand that this property was Crown granted by the province to the Regional District of Comox-Strathcona with a restrictive covenant. This may require the property to revert back to the province should the firehall use not continue.

If you have any questions please call me at (250) 741-5661.

Yours truly,

D W Berry
D.W. Berry
Land Officer

Enclosure

ISLANDS TRUST

200 - 1627 Fort Street, Victoria, B.C. V8R 1H8
Telephone: (250) 405-5151 Facsimile: (250) 405-5155
Internet: http://www.islandstrust.bc.ca
For toll free access, request a transfer via Enquiry BC:
In Vancouver 660-2421; elsewhere in B.C. 1-800-663-7867

February 26, 2003

File:HO/13

D.W.Berry, Land Officer
Land and Water B.C. Inc.
345 Wallace Street
Nanaimo, BC V9R 5B6

Dear Mr. Berry:

Re: Potential Site for new Fire Hall, Hornby Island

Mr. Gifford LaRose, Hornby Island Fire Chief, has passed us a copy of your letter of 12 June, 2002 responding to his enquiry about the possibility of utilizing a Crown parcel north of Central Road for the site of a new Fire hall.

We note that your letter questions the selection of this site and the amount of land being proposed for Fire Department uses; it also mentions that this parcel has been proposed for additional Community Hall parking and identified for possible expansion of Hornby Island Athletic Association activities. Your letter also speaks to the need for all current and long-term community and public needs to be taken into account in planning for Crown land management and indicates LWBC Inc.'s preference that applications should be made by, or endorsed by, local government.

The Hornby Island Local Trust Committee is the local government responsible for land use planning on Hornby Island, while the Regional District of Comox Strathcona is responsible for service delivery. Some tax-supported services (including the operation of the Fire Department and the Community Hall) are managed by the Hornby Island Residents and Ratepayers Association under contract with the Regional District.

The Local Trust Committee views both the need for a seismically-sound Fire hall and the requirement for adequate parking at the Community Hall as being public safety priorities. At the same time, we recognize the importance of ensuring that long-term needs are carefully considered in planning the uses of public land.

To these ends, the Local Trust Committee will work closely with all parties (RDCS, HIRRA, the Fire Department, other community organizations and the public at large) to ensure that an effective community planning process is carried out in developing an overall proposal for the future use of this Crown

parcel. A product of this process might be separate but simultaneous applications (such as from RDCS for the Fire hall area and HIRRA for the parking area) that are endorsed by the local and regional governments. Through this planning process, a proposal could also be developed for future uses of the parcel if the Fire hall should move.

We would also like you to be aware that the Local Trust Committee has initiated dialogue with the Comox First Nation (and the Hamatla Treaty Society). We are working on a Protocol for Cooperation which will provide a framework for consultation, including on issues related to Crown lands.

We hope this will provide some assurance that the concerns of LWBC will be addressed through collaborative community / local government processes.

Yours truly,

David Essig, Chair
Hornby Island, Local Trust Committee

Pc. Gifford LaRose

Lieutenant-Governor.

A14799

THE GOVERNMENT OF THE PROVINCE OF BRITISH COLUMBIA

No. 4503

1116

LAND ACT

Deputy Minister of Lands.

ELIZABETH THE SECOND, by the Grace of God, of the United Kingdom, Canada and Her other Realms and Territories, Queen, Head of the Commonwealth, Defender of the Faith.

To all to whom these presents shall come, Greeting:

Known ye that We do by these presents, for Us, Our heirs and successors, in consideration of the sum of Ten dollars to Us paid, give and grant unto REGIONAL DISTRICT OF COMOX-STRATHCONA

its successors and assigns

All that Parcel or Lot of Land situate in NANAIMO District, and more particularly described on the Map or Plan hereunto annexed and coloured red and numbered Block "G" of the South half of the Northwest quarter of Section 11, Hornby Island,

on the Official Plan or Survey of the said Parcel or Lot in the Province of British Columbia, to have and to hold the said Parcel or Lot of Land, and all and singular the premises hereby granted, with their appurtenances, unto the said REGIONAL DISTRICT OF COMOX-STRATHCONA

Form "G" Land Registry Act (Sec 50)
[illegible] CERTIFICATION
Reg[illegible] day of 19
on [illegible] received at the time
written [illegible] on the a[illegible]
[illegible] Registrar of the [illegible]

its successors and assigns

— for so long as the land and premises hereby granted are used for firehall purposes — subject to the provisos written on the back hereof:

In Testimony whereof, We have caused these Our Letters to be made Patent, and the Great Seal of *OUR PROVINCE OF BRITISH COLUMBIA* to be hereunto affixed:

WITNESS, His Honour JOHN R. NICHOLSON, P.C., O.B.E., Q.C., LL.D. Lieutenant-Governor of Our said Province, at Our Government House, in Our City of Victoria, this Twenty-fourth day of January, in the year of our Lord one thousand nine hundred and Seventy-two and in the Twentieth year of Our Reign.

By Command.

Assistant Deputy Provincial Secretary.

Land Act, 1970

JAN 26 1972

FILE 0302797

PARLIAMENT BUILDINGS
VICTORIA, BRITISH COLUMBIA A14799

LANDS BRANCH
DEPARTMENT OF LANDS, FORESTS, AND WATER RESOURCES

JAN 27 10:40

Regional District of Comox-Strathcona
Attention: K. C. Neila
Rm. 4, 469-4th Street
Courtenay, B.C.

Dear Sir or Madam:

The undermentioned Crown grant has today been forwarded to the

Victoria Land Registry Office for registration.

Crown Grant No. 4503/1116 Date: January 24th, 1972

Grantee:

REGIONAL DISTRICT OF COMOX-STRATHCONA

Description:

Block "C" of the South half of the Northwest quarter of Section 7, Hornby Island, Nanaimo District

Location: Hornby Island containing 1.15 acres.

Assessment District: Comox R.M.: 92 F/10 & 11-E (a-7,8)
N.T.S. 92 F/10-b

Mining Division:

Copy to:

- ☐ The Provincial Assessor Courtenay
- ☐ The Land Commissioner Nanaimo
- ☐ Chief Gold Commissioner
- ☐ Gold Commissioner
- ☐ The Land Inspector
- ☐

W. R. REDEL,
Director of Lands.

jmm

Traced by

Compared by

DL 4799

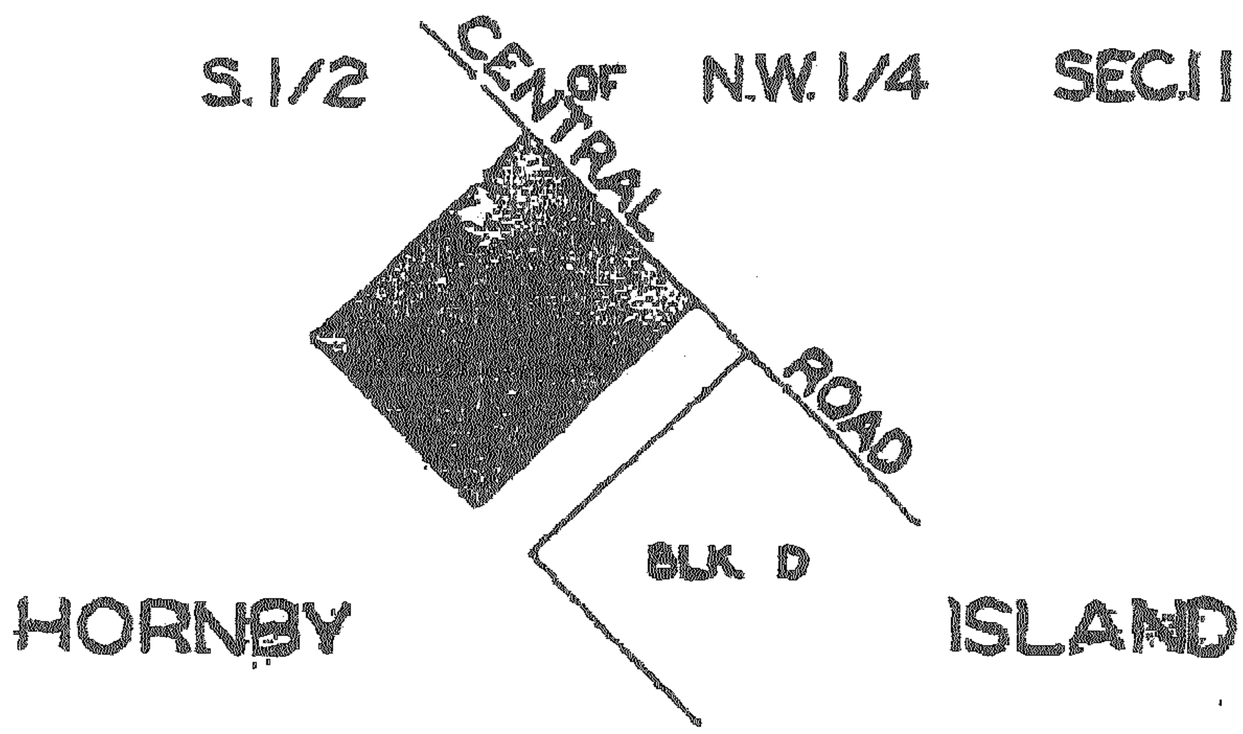
British Columbia

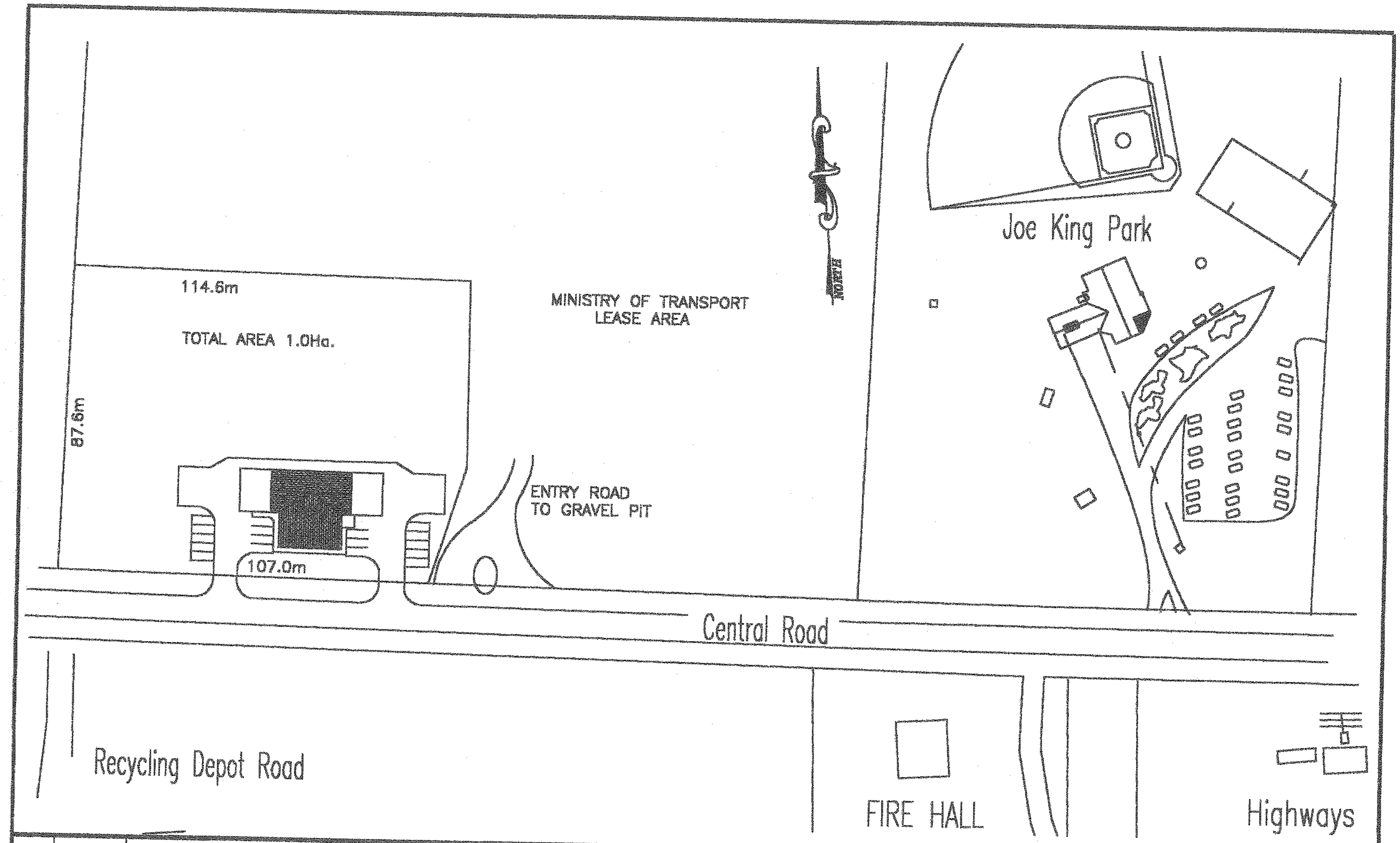
Crown Grant No. 1116

NANAIMO DISTRICT

REGIONAL DISTRICT OF COMOX-STRATHCONA

Scale, One Inch = 200 FEET





NO.	DATE	DESCRIPTION	BY

APPLICATION FOR
CROWN LAND LEASE
HORNBY ISLAND
FIRE DEPARTMENT

DRAWING:	FIREHALL
DRAWN BY:	GLR
DATE:	November 2004
SCALE: HOR. VER.	NTS
REV.	

Hornby Island Fire - Debt and Requisition Requirement Estimates

Borrowing Estimates

20 Year Term — **5% Capitalization Rate**

Principal:	**1,017,811.70**	**Interest Rate:**	**6.00%**	**S/F Factor:**	**0.030242587**

Total Annual Interest	61,069.70	Gross Proceeds	1,017,811.70
Total Annual Principal	30,781.26	Debt Expense 1.75%	17,811.70
Total Annual Payment	**85,743.10**	**Net Proceeds**	**1,000,000.00**

Note: Interest rate is at current MFA estimate and subject to change.

Requisition Estimates

Current maximum levy - Greater of $168,935 or $1.00 per $1000 taxable Value

2004 Authenticated Net Taxable Value		203,493,100
2004 Maximum Requisition	$	203,493
Debt costs per year		85,743
Total Requisition Required	$	289,236

Cost per $1,000 Residential Assessed Value

2004 Authenticated Converted Value		21,125,477
Debt costs per year	$	85,743
Equivalent Residential Rate Increase per $1000		**0.4059**

New Maximum Levy Requirement

2004 Authenticated Net Taxable Value		203,493,100
New Requisition Requirement	$	289,236
Maximum Levy 1.50 per 1000	$	305,240

REGIONAL DISTRICT OF COMOX-STRATHCONA

BYLAW NO. 2011

A BYLAW TO CONVERT THE "HORNBY ISLAND FIRE PROTECTION SPECIFIED AREA" WITHIN ELECTORAL AREA "A" (HORNBY ISLAND) TO A "LOCAL SERVICE AREA" AND TO PROVIDE FOR THE FIRST RESPONDER PROGRAM.

WHEREAS the Regional Board of the Regional District of Comox-Strathcona adopted "Hornby Island Bay Fire Protection Specified Area Establishment and Loan Authorization Bylaw, 1970" (Bylaw No. 40) to establish a specified area for the purpose of providing fire protection to the community of Hornby Island;

AND WHEREAS pursuant to Section 775(4) of the Municipal Act, where a Regional Board exercises a power to provide a service under Section 775(3), the Regional Board may adopt a bylaw in accordance with Section 775(5) which converts the service to a local service, exercised under the authority of an establishing bylaw;

AND WHEREAS the Regional Board wishes to convert the Hornby Island Fire Protection Specified Area to a "Local Service Area" under Section 775(5) of the Municipal Act;

AND WHEREAS the Director for Electoral Area "A" has consented to the Bylaw;

NOW THEREFORE the Regional Board of the Regional District of Comox-Strathcona in open meeting assembled enacts as follows:

LOCAL SERVICE ESTABLISHED

1. The local service hereby established and to be operated is the provision of:

   (a) fire prevention;

   (b) fire suppression; and

   (c) assistance in response to:

      i) calls for extrication of persons from damaged motor vehicles;

      ii) calls for assistance in the extrication of persons from damaged buildings, structures or natural hazards;

      iii) emergencies, where the equipment and personnel of the Department is required and police or ambulance personnel are unavailable or are unable to respond adequately; and

      iv) other emergencies including explosion; flood, earthquake, landslide, or other natural event; spill, release or leak of a substance capable of injuring people or damaging property; any emergency as declared under Section 796(I)(h) of the Municipal Act or under the Emergency Program Act;

      v) personal injury or illness requiring first aid medical treatment;

vi) rescue operations

vii) the provision of assistance under sections (i) to (vi) above, shall be subject to a determination by the Fire Chief that the personnel and equipment resources of the Fire Department are capable of responding to the emergency.

BOUNDARIES OF THE SERVICE AREA

2. The boundaries of the "Hornby Island Fire Protection Local Service Area" are shown outlined in heavy black on the map attached to this bylaw as Schedule "A".

PARTICIPATING AREA

3. Electoral Area "A" is the sole participating area for this local service.

COST RECOVERY

4. The annual cost for this local service shall be recovered by one or more of the following:

(a) The requisition of money under Section 823 of the Municipal Act to be collected by a property value tax to be levied and collected under section 825(1) and (2) of the Municipal Act; and

(b) By the imposition of fees and other charges that may be fixed by the Regional Board by separate bylaw for the purpose of recovering these costs.

MAXIMUM REQUISITION

5. The maximum amount that may be requisitioned under Section 816(1) of the Municipal Act for this service is the greater of:

(a) the sum of $168,935.00 per year; or

(b) the product obtained by multiplying the net taxable value of land and improvements within the service area by a property tax value rate of $1.00 per $1,000.00 of assessment, which when applied to the net taxable value of land and improvements within the local service area will yield the maximum amount that may be requisitioned for the service for Regional Hospital District purposes in the Local Service Area.

CITATION

6. This bylaw may be cited for all purposes as "HORNBY ISLAND FIRE PROTECTION LOCAL SERVICE ESTABLISHMENT BYLAW NO. 2011, 1998".

READ A FIRST AND SECOND TIME THIS 23RD DAY OF FEBRUARY , 1998.

READ A THIRD TIME THIS 23RD DAY OF FEBRUARY , 1998.

I hereby certify the foregoing to be a true and correct copy of Bylaw No. 2011 being "Hornby Island Fire Protection Local Service Establishment Bylaw No. 2011, 1998" as read a third time by the Board of the Regional District of Comox-Strathcona on the 23rd day of February, 1998.

B Whitehead
Secretary

APPROVED BY THE
INSPECTOR OF MUNICIPALITIES THIS 7TH DAY OF MAY ,1998.

ADOPTED THIS 29TH DAY OF JUNE , 1998.

D Andrews
Chairperson

B Whitehead
Secretary

I hereby certify the foregoing to be a true and correct copy of Bylaw No. 2011, being "Hornby Island Fire Protection Local Service Establishment Bylaw No. 2011, 1998" as adopted by the Board of the Regional District of Comox-Strathcona on the 29th day of June, 1998.

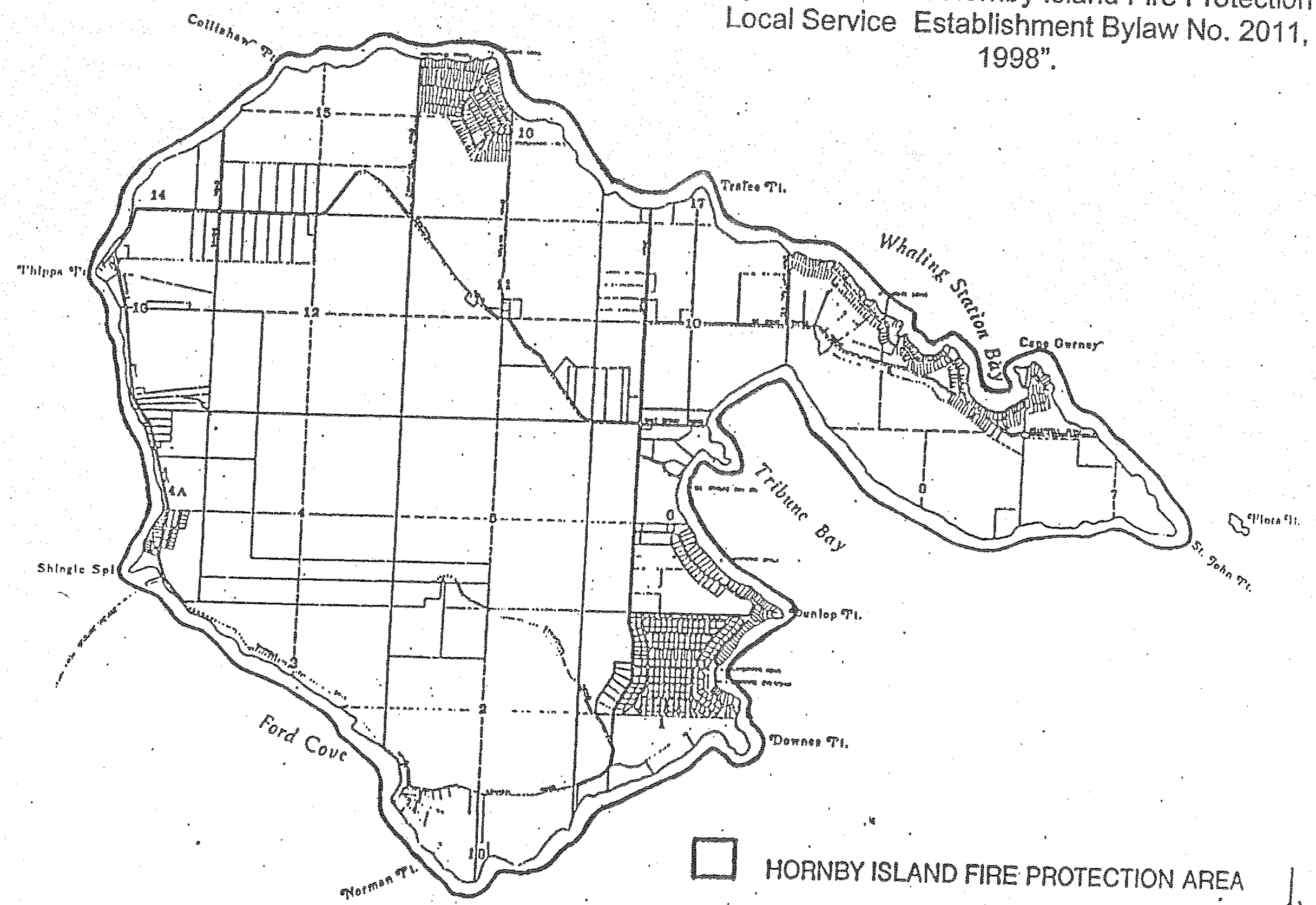
B Whitehead
Secretary

HORNBY ISLAND

ELECTORAL AREA 'A'

Schedule 'A'

Bylaw No. 2011 "Hornby Island Fire Protection Local Service Establishment Bylaw No. 2011, 1998".



REGIONAL DISTRICT OF COMOX-STRATHCONA

SCALE:

REGIONAL DISTRICT

Comox-Strathcona

I, Roxanna Mandryk, Director of Electoral Area 'A', hereby consent to the adoption of Bylaw No. 2011 being "Hornby Island Fire Protection Local Service Establishment Bylaw No. 2011, 1998."

R L Mandryk

Roxanna Mandryk
Director
Electoral Area 'A'

March 3/98

Date

Province of British Columbia

No. .....

Statutory Approval

Under the provisions of section 807(1)(a) and 813(9)

of the Municipal Act

I hereby approve Bylaw No. 2011

of the Regional District of Comox-Strathcona, *a copy*

of which is attached hereto.

Dated this 7th *day*

of May *,* 1998

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Deputy Inspector of Municipalities

M28-2068

HORNBY ISLAND FIRE DEPARTMENT 2005 Budget

Key	Budget Category	2002 Actual	2003 Actual	2004 Budget	Forecast 2004	Proposed 2005
	OPERATIONS					
A	HIRRA Administration	$3,504	$3,500	$3,500	$3,500	$3,500
B	Office costs	$1,691	$1,164	$1,400	$866	$3,400
C	Utilities	$5,895	$5,868	$7,742	$7,800	$7,800
D	Public Relations	$1,682	$1,671	$1,500	$3,400	$3,000
E	Bookkeeper	$2,496	$2,500	$2,500	$2,500	$2,500
F	Freight (incld. Postage)	$515	$896	$800	$1,250	$800
G	Building Maintenance	$5,319	$6,817	$4,000	$5,800	$6,000
H	Radio repair, batteries	$1,856	$2,457	$2,000	$1,800	$2,000
I	Fuel	$1,629	$2,881	$3,000	$3,400	$3,500
J	Fire Fighter Insurance	$3,238	$2,983	$3,300	$2,785	$3,300
K	Vehicle Maintenance	$10,856	$5,352	$6,000	$6,800	$6,000
L	Equipment Maintenance	$2,793	$5,068	$5,000	$4,400	$7,000
M	1st Aid Supplies	$1,264	$703	$1,500	$1,600	$1,700
N	Training	$10,839	$12,308	$15,000	$13,330	$15,000
O	Volunteer Fund	$2,200	$2,500	$2,500	$2,500	$2,500
P	Ass'n/subscription fees	$722	$861	$900	$674	$900
Q	Deficit payment		$2,500	$4,385	$4,385	
R	Chief salary	$10,729	$12,000	$12,000	$12,000	$15,600
S	Training Officer salary	$3,120	$3,120	$3,120	$3,120	$3,600
T	Secretary salary	$3,380	$3,380	$3,380	$3,380	$3,380
U	Deputy Salary					$3,600
V	LAFC honorarium					$1,200
W	Summer Fire Patrol	$15,979	$16,170	$12,500	$12,536	$14,000
X	Benefits, WCB, EI	$3,792	$3,401	$4,060	$5,648	$6,353
Y	Income	($1,337)	($2,450)		($2,063)	($3,500)
Z	**Sub-Total**	**$92,162**	**$95,650**	**$100,087**	**$101,411**	**$113,133**
ZA	Equipment Upgrade	$5,443	$8,000	$15,886	$15,008	$12,000
ZB	Fire Hose	$3,458	$2,630	$2,500	$2,119	$2,500
ZC	Pagers	$1,700	$3,385	$3,100	$2,721	$1,200
ZD	Turnout Gear	$4,848	$4,489	$5,500	$5,500	$5,500
ZE	**Sub-Total**	**$107,611**	**$114,154**	**$127,073**	**$126,758**	**$134,333**
	CAPITAL					
ZF	Water Sources	$12,106	($628)	$3,500	($121)	$0
ZG	Structure	$1,064	$3,625	$2,000	$0	$0
ZH	Vehicles				$8,507	
ZI	**TOTAL**	**$120,781**	**$117,151**	**$132,573**	**$135,144**	**$134,333**
	Regional District					
	Support Services	$5,683	$4,755	$5,511	$5,511	$5,668
	Licenses/Permits	$520	$520	$520	$520	$520
	Insurance Liability	$3,304	$3,813	$5,706	$5,706	$5,706
	Insurance Property	$436	$1,052	$1,052	$724	$724
	Legal Fees	$1,500	$1,150	$1,000	$1,387	$1,000
	Insurance Vehicle	$3,600	$3,600	$3,659	$3,600	$3,600
	Reserve Contribution	$10,900	$38,132		$12,855	$11,058
	MFA Loan	$29,544	$9,000	$35,884	$35,884	$35,884
	Surplus prior year				($3,167)	
	Funds for future Expenditure				$5,000	$5,000
	RDCS subtotal	**$55,487**	**$62,022**	**$53,332**	**$68,020**	**$69,160**
	BUDGET TOTAL	**$176,268**	**$179,173**	**$185,905**	**$203,164**	**$203,493**