City of Richmond

Report to Committee

To:	General Purposes Committee	**Date:**	January 8, 2003
From:	Jim Bruce General Manager, Finance and Corporate Services	**File:**	0975-01-2003
Re:	**2003 Capital Plan referrals**		

Staff Recommendation

It is recommended that:

1. the following report be received for information;
2. the 2003 Capital Plan final draft be adopted for inclusion in the 2003 Five Year Financial Plan (2003-2007). The final draft is to be determined during the General Purposes Committee meeting on January 20, 2003 and;
3. that staff be authorized to commence construction of the 2003 projects.

Joe Erceg
Chair Land & Capital team

Jim Bruce
General Manager,
Finance and Corporate Services

Att.

Staff Report

Origin

As a result of discussion arising at the Special General Purposes Committee of December 23, 2002 there were ten referrals made requesting additional information on some of the 2003 Capital submissions.

Analysis

Each of the stakeholders (names in brackets below) responsible for the capital submissions have compiled the information and they are attached for your information in the following documents:

Attachment A – Nelson Road widening – widening of the road to four lanes and the closure of No. 8 Road to trucks only (Gordon Chan).

Attachment B – Blundell Road, No. 4 Road to No. 5 Road – Road Base, Expansion Date, Watermain and Drainage – when is the proposed expansion to four lanes planned to occur and the cost of such expansion (Gordon Chan).

Attachment C – Physical Plant Sustaining Capital – provide additional information on what should be budgeted for to attain appropriate level (David Naysmith).

Attachment D – Special Sports Statutory Reserve Fund – clarification of the amount resolved by Council to be contributed to the Fund on a yearly basis (Mike Redpath).

Attachment E – Waterfront Improvement Projects – Plan – provide information on specific projects (Lani Schultz).

Attachment F – Vehicle Reserve Purchases – options for purchase/lease of a Hydro Excavator and when the purchase/lease was anticipated to take place (Eric Gilfillan).

Attachment G – Britannia Heritage Shipyard

a. a review of the estimate provided by Westmar Consultants. Councillor Steves requested a copy of the consultants report on the piles be provided and;

b. the portion of the project that could be accomplished "in house" (David Naysmith).

Attachment H – Phoenix Gillnet Loft – provide various options for, and the cost of, securing the building and replacing one pile (David Naysmith).

Attachment I – Fire Vehicle Replacement Loan – the impact on the Vehicle Acquisition Program and the implications of delaying funding (Wayne Stevens/Mike Mack).

Attachment J – King George Park Caretakers Suite – second storey (Dave Semple).

Financial Impact

Please refer to 2003 Capital Plan report from the Chair of the Land and Capital Team and the General Manager of Finance and Corporate Services dated December 10, 2002.

Conclusion

The 2003 Capital Plan was strategically developed to best represent the interests of all stakeholders while meeting the City's Corporate Vision. The Plan utilizes existing funding in an effective manner while ensuring the City's strong financial position is not impacted.

Joe Erceg
Chair Land & Capital team

Jim Bruce
General Manager,
Finance and Corporate Services

JWB:naw

ATTACHMENT A.

NELSON ROAD WIDENING

The proposed 2003 capital program includes the upgrade of Nelson Road between Westminster Highway and Blundell Road to create much wider travel lanes and shoulders and a reconstructed road base to full industrial standard at a cost of $2.4 million. Traffic analysis conducted by consultants retained by the Fraser River Port Authority, as part of their site traffic impact study, indicates that widening Nelson Road to four lanes is not required at this time and may not be required for another ten years. The precise implementation timing of the four-laning project is dependent on the pace of development in the area. The estimated cost of four-laning Nelson Road from Westminster Highway to Blundell Road is $6.65 million (excluding environmental compensation).

The current and projected Roads DCC available from 2002 to 2006 is insufficient to fund the construction of four lanes. In addition, by proceeding with the four lane widening prior to receiving approval of this roadway by TransLink as part of the region's "Major Road Network", any money spent now will not be eligible for 50% cost sharing with TransLink. Should the City choose to advance the four-laning of Nelson Road to support economic development initiatives, external funding would be required. The Finance Division is currently investigating alternative City funding sources to provide the "seed" money to match any external financial assistance in the ultimate widening of Nelson Road to a four lane facility.

The referral regarding the closure of No. 8 Road to truck traffic from Westminster Highway to Blundell Road was previously addressed in a memorandum to Council, dated December 12, 2002. In summary, a truck ban will not be implemented until the upgrading of Nelson Road is completed.

ATTACHMENT B.

BLUNDELL ROAD DRAINAGE, NO. 4 ROAD TO NO. 5 ROAD

The proposed 2003 capital program includes watermain replacement from No. 4 Road to No. 5 Road, drainage and ditch infill on the south side from No. 4 Road to Shell Road and the repaving of the existing road between No. 4 Road and No. 5 Road at a cost of $1.4 million. Widening this section of Blundell Road to four lanes does not rank highly on the City's current priorities for new roadway investment and is considered a longer term project. In addition, a complete reconstruction of the road base and widening to four lanes is estimated to cost close to $6 million due to the extremely poor soil conditions in the area. Based on current DCC projections, there is inadequate funding in the five year Roads DCC income stream to support this project. As a result, the four lane widening will not be constructed within the next five years. The timing of implementing the four lane widening of Blundell Road is largely dependent on the provision of a new interchange with Highway 99. The cost efficiencies gained by constructing the four lanes at the same time as the drainage and watermain work, are considered to be marginal.

ATTACHMENT C.

PHYSICAL PLANT SUSTAINING CAPITAL

The staff report received by Engineering and Public Works Committee Sept 18, 2002 identified as option (2), a total annual funding requirement of $5,776,500 that would control the maintenance backlog at the current levels, effectively retaining City buildings in the same relative condition as today with a Facility Condition Index (FCI) of 0.13 rather than the preferred FCI of 0.05, option (3) which would require $6,412,150 in annual funding of approximately 3.25% of Building Value.

This level of infrastructure funding is consistent with the recommended funding formulas developed by agencies such as the American Public Works Association, International Facility Managers Association, Building Owners and Operators Association and the National Research Centre Canada of between 2% and 4 % of building replacement values.

In this instance the first 2% represents annual costs for preventative, and demand maintenance costs calculated on a total building value of $200,000,000 ($4,000,000 per year) and the difference ($6,412,150 - $4,000,000 = $2,412,150) or 1.25% represents funding for cyclical maintenance items.

Based on the above calculations, including the existing maintenance funding provided in the annual operating budget of $1,579,207 and the proposed 2003 Capital allocation of $560,000 there is a shortfall of between **$3,637,293 and $4,272,943.**

Recognizing the overall impact of this shortfall, together with other infrastructure requirements throughout the City and until such time as a solution for addressing sources of sustainable funding has been determined, staff have suggested a minimum level of Physical Plant and Sustaining Capital funding of **$1,000,000** to address the most critical issues. This figure is based upon the ability of our existing resources to manage and complete the program within an 18-month time frame.

ATTACHMENT D.

SPECIAL SPORTS STATUTORY RESERVE FUND

A Sports Statutory Reserve Fund (established as a sub-fund of the Capital & Building Infrastructure Reserve) was approved by Council in March 2000 for the purposes of funding Richmond's first artificial turf field. This was one of a number of recommendations from the Findings of the Feasibility Study for the Development of the 20-Acre City-Owned Riverport site.

Council directed staff to continue working with the Sports Council to review options for developing high quality lit sports fields.

This fund was originally submitted as a capital request in 1999 for the year 2000 Capital program. At that time the original amount requested was $250,000.

In 2000, the fund was approved, and in 2001, the fund was increased to $400,000 to support the installation of the artificial turf field at Minoru.

In the 2002 Capital program the contribution to the fund was $150,000 to bring the balance up to the required amount for completing the turf field at Minoru.

In summary, the fund contributions have been variable over the three-year period (2000 to 2002) with an average of $260,000 per annum.

ATTACHMENT E.

WATERFRONT IMPROVEMENT PROJECTS

Staff are preparing a full report on the Waterfront Strategy to General Purposes Committee for review at the January 20th meeting. This report outlines the next steps to developing and implementing the City's Waterfront strategy and includes a recommendation to focus on three areas of the City in 2003:

1. Continuation of the work being carried out in the Steveston Imperial Landing area, including clarifying the vision for this waterfront area, determining the use of the waterlots in front of the Imperial Landing Development, and exploring possible partnership opportunities for the development of amenities in this area.

2. Planning, design and construction of Capital improvements along the City Centre waterfront from the Dinsmore Bridge to the Moray Channel Bridge. The intent of capital development in this area is to proactively set the standard for future City Centre development by providing a significant urban waterfront experience in this area, and an economic catalyst for the development of surrounding lands. It is anticipated that a significant public waterfront improvement in this area will enhance the value of the City's River Road property for whatever future plans Council endorses for these lands, and will provide a lift to other adjacent land values as well. As such, in the future, the money that is spent on this development will eventually come back to the City in the form of other revenues, providing both public amenity and economic legacies for the City. Given the profile and visibility of this area, great exposure will be provided for a City initiative that not only improves the public amenities in the area, but also has great economic and quality of life benefits for the City.

   Specific projects for this area have not yet been identified, pending approval from Council of the Waterfront Report. If approved, staff will be seeking input from various communities including the design, development, business and residential communities to determine a plan for this area, and to develop specific projects for Council consideration. It is intended that this work be coordinated with the ongoing work in Urban Development which is looking at the potential development of the City's River Road properties.

3. The initial planning stages for a significant public amenity for the City's 50 acres located at the foot of No. 3 Road.

ATTACHMENT F.

PURCHASE OF HYDRO EXCAVATOR EQUIPMENT

Further to the December 23, 2002 General Purposes meeting, following are budget options and associated estimated financial impacts related to the purchase of Hydro Excavation equipment (as opposed to our current process of contracting the equipment as required). Staff are currently in the process of completing a business case analysis to determine which is the more favourable solution to provide this service. The figures that follow below are estimates only as the specific equipment specifications to meet operational needs have not been fully determined. The cost of the subject equipment will likely range from $430,000 to $475,000. For the purposes of this analysis, a total median price of $450,000 and a 5-year life cycle has been used.

1. Capital Purchase – Council would have to approve a one time expenditure of approximately $450,000. Our in-house equipment rate would likely be $70.34/hour plus labour estimated to be $66.92/hour (for two staff members) resulting in a rate at $137.26/ hour which includes the contribution to the City's equipment replacement reserve.

2. Lease to Purchase – Arrange a five-year lease of the equipment. The monthly cost quoted for budget purposes is $5,458. Our operating and maintenance costs are estimated to be $1,300 per month. Based upon these figures, the total rate would therefore be $120.98/hour (lease/maintenance rate of $54.06/hour plus the estimated labour rate of $66.92/hour). At the end of the 5-year period, the City would not own the asset and would have the option to pay an additional $225,000 plus taxes to purchase the equipment.

3. Lease – This option is similar to the "Lease to Purchase" option discussed above with the exceptions that the lease rate would be in the order of 10% higher than the budget quote received from MFA and accordingly, the new rate would be $125.35/hour. Additionally, the option to purchase the equipment at a residual value wouldn't be exercised. However, there would be no contribution to the reserve to replace the equipment and any abnormal wear/damage would be at the City's cost when the equipment is returned. At the end of the 5-year period, a new lease would be negotiated and new rates would be established.

Hydro Excavator equipment usage in 2002 to July 5 was 1315 hours which, when prorated comes to 2533 hours for the year. Once the 2002 information is available a more accurate figure may be provided. The City contracted hydro Excavation equipment for 2799 hours in 2001 for a total cost of $427,253 which is up from 2000 where this equipment was used for 1543 hours. Based on 2080 available hours (5days/week, 8 hours per day), there appears to be a need for this equipment.

If the Capital Purchase option is exercised as discussed in Item 1 above, the annual capital recovered would be $89,915/year. The return on this investment will be 5 years, and depending on the equipment condition at the end of this period, equipment usage could possibly be extended up to 7 years.

Further issues that should be considered prior to equipment purchase are the productivity of the subject equipment as well as the intangibles, some of which are of flexibility, reliability and liability compared to contracted equipment that is currently being utilized. It should be noted that the determination of the anticipated productivity of the new equipment remains an unknown given considerable difficulty has been experienced in collecting data in this regard.

It is anticipated that a report on the cost benefits of purchasing Hydro Excavation equipment with a recommendation to the Public Works and Transportation Committee will be completed by late January or early February, 2003. If the business case supports the City acquiring Hydro Excavator instead of using contracted equipment, staff would recommend that the "Capital Purchase" option outlined in Item 1 be considered.

ATTACHMENT G.

BRITANNIA HERITAGE SHIPYARD "SEINE NET LOFT" COST ESTIMATE

Originally Council approved $150,000 in the 2002 Capital Program for Net Loft building upgrades. However, it was subsequently reviewed and agreed with the Britannia Shipyard Building Committee to investigate and undertake the critical substructure repairs before proceeding with this part of the program, which would result in retaining an F2 Occupancy (medium hazard - industrial). The 2003 Capital project submission of $259,032 is proposed to address these items.

a) This project estimate was prepared by staff using known factors considered in the 1998 Development Strategy Report by Quoin Project and Cost Management Ltd. (refer to project submission sheet) and increased to reflect 9.59% inflation from 1998 and 35% design, contingency, permit, taxes and overhead costs

In December 2002 a more detailed and updated inspection of the Seine Net Loft building was completed by Westmar Consultants that confirmed the relative accuracy of the project's earlier estimate resulting in a total of $234,600 including 15% permits, taxes and overhead costs. (Westmar report doc).

b) As much of the work is over and under water, tidal activity may play an important role in scheduling manpower and equipment to maximize construction activity, which may conflict with other City construction programs during the summer schedules and potentially increase costs.

However, the ability for City Trade Department's forces to participate in the upgrade is possible and can be accommodated through the opportunity to submit a "Tender" along with other pre-qualified general contractors, under the supervision of the engineering consultants.

CITY OF RICHMOND

Inspection Report for:

Britannia Net Loft - Superstructure

02847
December 2002

Prepared by: *[Original signed by Victor Szabo]*
p.p. Anthony G. Bleasdale, A.Sc.T.

Approved by: *[Original signed by Alden Evans]*
Alden Evans, P.Eng.

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1 Introduction

Facility: Britannia Net Loft, Steveston, BC

Inspected by: Westmar Consultants Inc.: Alden J. Evans, P.Eng.
Anthony G. Bleasdale, A.Sc.T.
Murray Marquardt
Alan Love

Inspection Date: November 12 and 26, 2002

1.1 Purpose of Inspection

The purpose of the inspection is to determine the overall condition of the superstructure to the Phoenix Net Loft facility. Based on the inspection results, and subject to the intended future use of the facility, a prioritized program of repairs and maintenance work can be implemented.

1.2 Scope of Work

The scope of work is in accordance with the terms of reference presented in Westmar's letter dated April 9, 2002. A summary is presented below:

- A visual inspection of the entire net loft superstructure (i.e., piles, pile caps, etc.) to identify the extent of any obvious damage and/or excessive deterioration. The building is not part of the inspection.

- A hand drilling/coring program of the top of each timber pile, the section of pile cap immediately above each pile, corbel blocks, and a representative number of stringers and decking members to identify the extent of internal fungal decay which may be present.

- An underwater visual inspection of the submerged portion of each pile to determine the extent of any mechanical damage, and possible deterioration from marine borer infestation.

- The preparation of a detailed report presenting the inspection findings and recommendations for immediate repairs, and short and long term maintenance requirements.

In order to assist the City with the significance of the inspection findings, an estimate of the costs of any rehabilitation work will also be prepared.

1.3 Reference Material

No reference material was made available prior to the inspection.

2 Description

The Britannia Net Loft facility consists of a 45 m by 20 m two-storey timber structure and two approach trestles, all of which are supported on a timber pile and deck substructures. *Photograph Nos. 1 through 7* in *Appendix A* present general views of the facility.

2.1 Reference System

The reference system for bent numbering and baylines is in accordance with *Figure 1* on the following page. Where indicated, cross bracing is referenced to the top connection of the member going down the brace.

2.2 Geometry

Net Loft

The wharfhead consists of a timber deck supported on untreated timber stringers, pile caps and piles. The pile caps are parallel to the longitudinal axis of the facility, with the longitudinal axis of the structure being in a north-south direction. Member geometry is summarized below:

- Deck Planking: 50 mm by 250 mm spanning 600 mm (maximum)
- Stringers: 100 mm by 330 mm spanning 5.25 m (maximum)
- Pile Caps: 325 mm by 400 mm spanning 4.0 m
- Piles: Varies 350 to 450 mm diameter

There is no horizontal restraint to the net loft superstructure.

East Approach

The approach consists of a timber deck supported on untreated timber stringers, pile caps and piles. The pile caps are parallel to the longitudinal axis of the facility, with the longitudinal axis of the structure being in a north-south direction. Member geometry is summarized below:

- Guardrail: 200 mm by 200 mm (no raisers)
- Deck Planking: 50 mm by 300 mm spanning 600 mm (maximum)
- Stringers: 50 mm by 350 mm spanning 2.5 m (maximum)
- Pile Caps: 300 mm by 305 mm spanning 2.5 m (maximum)
- Piles: Typically 300 mm diameter

There is no horizontal restraint along the east approach.

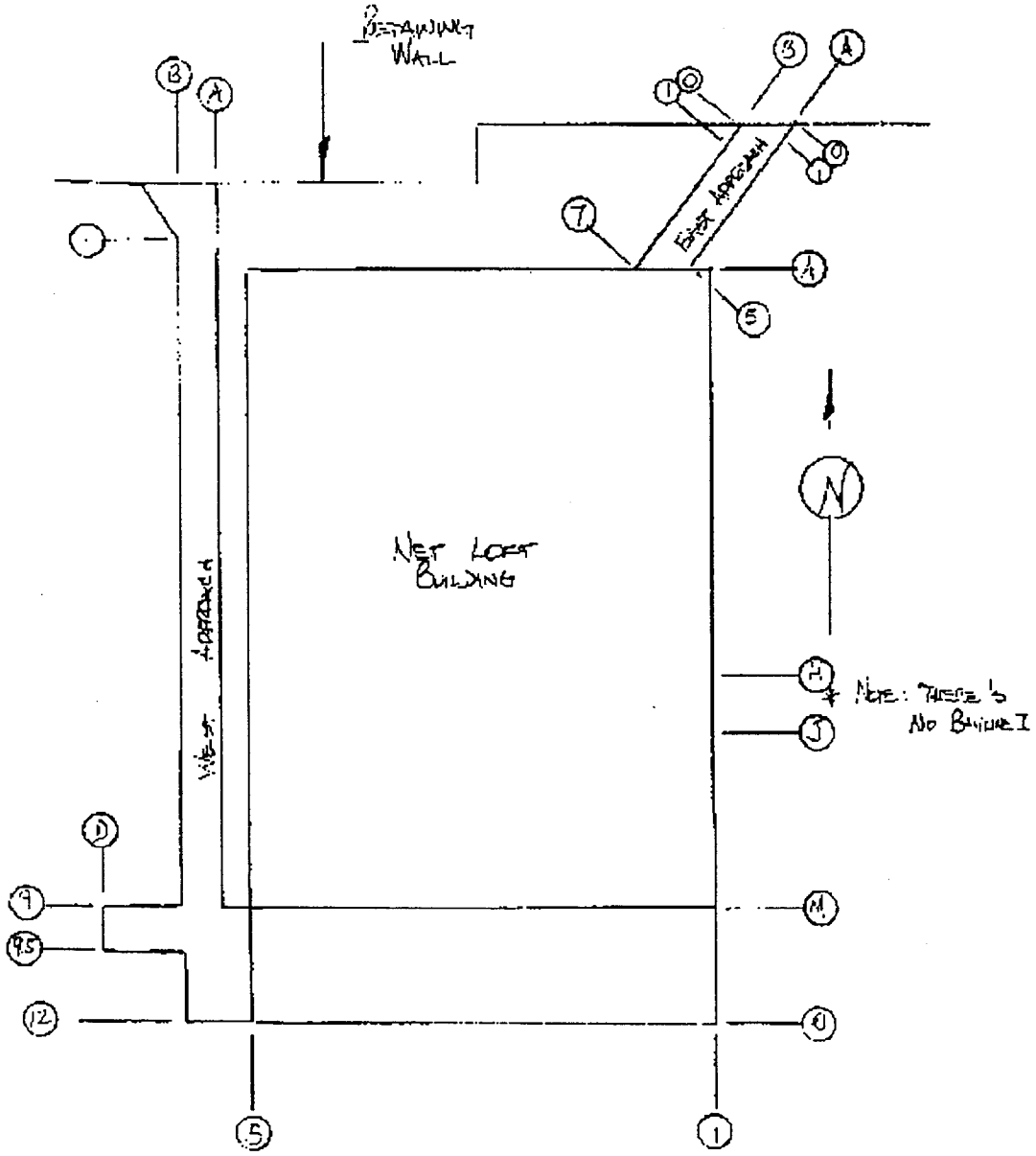

FIGURE 1: General Arrangement Showing Reference System (NTS)

West Approach

The approach consists of a timber deck supported on both treated and untreated timber stringers, pile caps, posts, subcaps and piles. The pile caps are perpendicular to the longitudinal axis of the facility, with the longitudinal axis of the structure being in a north-south direction. Member geometry is summarized below:

- Guardrail: 150 mm by 200 mm (no raisers)
- Deck Planking: 50 mm by 150 mm spanning 600 mm (maximum)
- Stringers: Interior - 100 mm by 330 mm spanning 5.3 m
  Edge - 175 mm by 330 mm spanning 5.3 m
- Pile Caps: 295 mm by 295 mm spanning 1.5 m and 4.0 m
- Posts: 295 mm by 295 mm
- Subcaps: 295 mm by 295 mm spanning 1.5 m
- Piles: Typically 350 mm diameter
- Cross Bracing: 75 mm by 200 mm

Horizontal restraint is provided by transverse cross bracing at every bent location.

The timber handrails consist of a 100 mm by 100 mm post, a 50 mm by 150 mm top rail and four 50 mm by 100 mm side rails.

3 Inspection Results

The detailed inspection observations and related reference material are presented in the appendices as described below:

- *Appendix A* presents the photographs taken during the inspection.

The general condition of the various elements of the wharf are described below. Tables itemizing members with damage or deterioration, and the recommended repair options are referenced in and follow, the general descriptions.

Note that the term "serviceable condition" is used to describe an element which still functions in the manner in which it was originally intended.

3.1 Net Loft

3.1.1 Deck

Access to the interior of the net loft was not obtained at the time of inspection, therefore a visual inspection was performed to the underside portion of the decking. The deck is in a serviceable condition. Although repairs are not recommended at this time, continued monitoring of the deck is recommended.

3.1.2 Building Columns

The base of the building columns bear directly on top of the pile cap and the bottom 350 mm is exposed under the net loft. The base of the columns are in a serviceable condition with localized minor deterioration due to fungal decay. Specific members identified with damage/deterioration is presented in *Table 3.1.2* below:

TABLE 3.1.2: Net Loft - Damage to Columns

Bent No.	Pile	Description of Damage	Recommendation
1	M	25% cross-section loss (CSL) due to fungal decay (*Photograph No. 8*).	Monitor for further deterioration.
3	K	10% CSL due to fungal decay.	Monitor for further deterioration.
5	M	25% CSL due to fungal decay.	Monitor for further deterioration.

3.1.3 Stringers

The stringers are in a serviceable condition. The cross bridging timbers providing lateral support to the stringers are no longer in a serviceable condition with 75% of the supports missing and the spikes securing the cross bridging timbers have pulled through the timber (*Photograph No. 9*). Replacement of the stringer cross timbers is recommended.

3.1.4 Pile Caps

The pile caps are in a serviceable condition with minor deterioration due to weathering and internal fungal decay. Specific members identified with damage/deterioration is presented in *Table 3.1.4* below:

TABLE 3.1.4: Net Loft - Damage to Pile Caps

Bent No.	Pile	Description of Damage	Recommendation
1	E	50% CSL due to fungal decay north of splice.	Replace from C to E.
	M	10% CSL due to fungal decay north of splice.	Monitor for further deterioration.

3.1.5 Bearing Piles

The bearing piles are generally in a serviceable condition with localized deterioration due to fungal decay and marine borer damage. There is typically up to 10% CSL due fungal decay and abrasion along the external section of pile above the lower intertidal zone (*Photograph Nos. 10 and 11*). Specific areas of damage/deterioration is presented in *Table 3.1.5* below:

TABLE 3.1.5: Net Loft - Damage to Bearing Piles

Bent No.	Pile	Description of Damage	Recommendation
1	A	Wet internal fibres in the top 300 mm.	Monitor for further deterioration.
	B	10% CSL due to fungal decay and wet internal fibres in the top 600 mm.	Monitor for further deterioration.
	C	50% CSL in the top 900 mm due to fungal decay.	Replace pile.

Bent No.	Pile	Description of Damage	Recommendation
1	G	10% CSL due to fungal decay in the top 300 mm.	Monitor for further deterioration.
	J	Displaced 100 mm east (*Photograph No. 12*).	Realign and strap pile.
	L	50% CSL in the top 600 mm due to fungal decay with wet fibres at the top 900 mm.	Freshead pile and install double corbel blocks.
	M	25% CSL due to fungal decay in the top 600 mm (*Photograph No. 13*).	Monitor for further deterioration.
2	A	25% marine borer cavity (MBC) at the mudline.	Monitor for further deterioration.
	B	25% MBC at the mudline.	Monitor for further deterioration.
	O	50% CSL in the top 300 mm due to fungal decay with wet fibres at the top 600 to 900 mm.	Freshead pile and install double corbel blocks.
3	A	25% CSL in the top 600 mm and 10% CSL at the top 900 mm due to fungal decay.	Monitor for further deterioration.
	C	10% CSL due to fungal decay in the top 300 mm.	Monitor for further deterioration.
	K	25% CSL in the top 900 mm due to fungal decay.	Monitor for further deterioration.
	N	Wet internal fibres in the top 300 mm.	Monitor for further deterioration.
4	D	25% CSL due to fungal decay and wet internal fibres in the top 600 mm (*Photograph No. 14*).	Monitor for further deterioration.
	F	25% CSL due to fungal decay in the top 300 mm.	Monitor for further deterioration.
	H	10% CSL due to fungal decay in the top 600 mm.	Monitor for further deterioration.
	N	25% CSL due to fungal decay in the top 300 mm.	Monitor for further deterioration.
5	C	10% CSL due to fungal decay in the top 300 mm.	Monitor for further deterioration.
	J	75% CSL in the top 600 mm due to fungal decay and 50% CSL at the top 900 mm.	Replace pile.
	K	Wet internal fibres in the top 900 mm.	Monitor for further deterioration.

Bent No.	Pile	Description of Damage	Recommendation
5	L	50% CSL in the top 300 mm due to fungal decay with wet fibres at the top 600 mm.	Freshead pile and install double corbel blocks.
	M	Wet internal fibres in the top 900 mm.	Monitor for further deterioration.

3.2 East Approach

In general the east approach is in poor condition due to widespread deterioration due to fungal decay. The following details the damage and repair options, however, pending future use consideration should be given to the complete removal of the east approach.

3.2.1 Guardrail

The guardrails are in a serviceable condition with moderate deterioration due to weathering. Although repairs are not considered necessary at this time, continued monitoring of the guardrails is recommended.

3.2.2 Deck

The deck is in poor condition. Over 50% of the deck planks exhibit severe fungal decay and/or severe splitting (*Photograph No. 15*). If 50% of the deck planks are replaced within the next two years, it is anticipated the remaining deck planks will require replacement within the next five years.

3.2.3 Stringers

The stringers are in a serviceable condition with up to 25% CSL due to fungal decay at the ends (*Photograph No. 16*). Although repairs are not considered necessary at this time, it is anticipated that repairs will be required within the next five years.

3.2.4 Pile Caps and Corbels

The pile caps are in poor condition with extensive deterioration due to internal fungal decay. Specific members identified with damage/deterioration is presented in *Table 3.2.4* on the following page.

TABLE 3.2.4: East Approach - Damage to Pile Caps/Corbels

Bent No.	Pile	Description of Damage	Recommendation
A	Abutment	75% CSL due to fungal decay.	Replace entire pile cap and replace corbel block at Pile No. 3.
	1	75% CSL due to fungal decay.	
	2	75% CSL due to fungal decay (*Photograph No. 17*).	
	3	50% CSL due to fungal decay north of splice and corbel has 50% CSL.	
	4	50% CSL due to fungal decay north of splice.	
B	3	75% CSL due to fungal decay north of splice.	Replace pile cap from Pile Nos. 2 to 4 and replace corbel blocks at Pile Nos. 4 and 5.
	4	50% CSL due to fungal decay north of splice and corbel has 50% CSL .	
	5	Corbel has 75% CSL due to fungal decay.	

3.2.5 Bearing Piles

The bearing piles are generally in a serviceable condition with localized deterioration due to fungal decay and marine borer damage. There is typically up to 10% CSL due fungal decay and abrasion. Specific areas of damage/deterioration is presented in *Table 3.2.5* below:

TABLE 3.2.5: East Approach - Damage to Bearing Piles

Bent No.	Pile	Description of Damage	Recommendation
A	Abutment	25% CSL due to fungal decay in the top 300 mm.	Monitor for further deterioration.
	1	10% CSL due to fungal decay in the top 300 mm.	Monitor for further deterioration.
	2	25% CSL due to fungal decay in the top 300 mm.	Monitor for further deterioration.
	3	Wet internal fibres in the top 300 mm.	Monitor for further deterioration.

Bent No.	Pile	Description of Damage	Recommendation
A	4	Wet internal fibres in the top 300 mm.	Monitor for further deterioration.
	5	25% CSL due to fungal decay in the top 300 mm.	Monitor for further deterioration.
B	Abutment	50% CSL in the top 600 mm and 10% CSL at the top 900 mm due to fungal decay.	Freshead pile and install double corbel blocks.
	1	50% CSL in the top 300 mm due to fungal decay.	Freshead pile and install single corbel block.
	3	50% CSL in the top 300 mm due to fungal decay.	Freshead pile and install single corbel block.
	5	Wet internal fibres in the top 300 mm.	Monitor for further deterioration.
	6	75% CSL in the top 600 mm (pile has corbel already).	Replace pile.

3.3 West Approach

The west approach has recently undergone extensive repairs (*Photograph No. 18*).

3.3.1 Handrails

The handrails are in a serviceable condition.

3.3.2 Guardrail

The guardrails are in a serviceable condition.

3.3.3 Deck

The deck is in a serviceable condition.

3.3.4 Stringers

The stringers are in a serviceable condition.

3.3.5 Pile Caps and Subcaps

The pile caps are in a serviceable condition.

3.3.6 Bearing Piles and Posts

The bearing piles are generally in a serviceable condition with up to 10% CSL due fungal decay and abrasion in the section of pile above the intertidal zone. Although repairs are not considered necessary at this time, continued monitoring of the piles is recommended.

3.3.7 Cross Bracing

The cross bracing is in a serviceable condition.

4 Residual Life Estimates of Structural Elements

An estimate of the residual life of each structural element is an essential part of the long term planning and maintenance process. The estimates presented below are based on the following assumptions:

- Where creosote or salt-treated timber has been examined for the presence of decay and is found to be sound, an estimated life in excess of 10 years is deemed appropriate. However, this facility was built entirely of untreated timber.

- Where some evidence of decay has been found, but limited in extent, the element can be assumed to have a residual life in the order of 3 to 7 years.

- Where an element has a weakened cross-section due to decay, the residual life should be taken as negligible, and the element should be considered unreliable for structural loads.

- Were individual bracing members are damaged, the level of redundancy within the entire system is assessed before making recommendations for repairs/replacement.

- Residual life should be established for each major class of elements in the structure, i.e., decking, guardrails, stringers, pile caps, piles, and bracing, and for individual elements within these classes where replacement of the deficient individuals is practical.

It is important to note the following:

- These are approximate values as fungal decay (or rot) will spread quickly once established in the structure and where conditions are favourable.

- Marine structures are typically designed for a service life of 25 years. However, experience has shown that the life expectancy can actually vary from between 20 to 40 years, and 50 year old marine structures, with an ongoing maintenance repair program are not uncommon in British Columbia.

Net Loft

- Decking: 8 to 10 years
- Stringers: 8 to 10 years
- Pile Caps: 6 to 8 years, except where noted
- Piles: 4 to 8 years, except where noted

East Approach

- Decking: 0 to 4 years
- Stringers: 2 to 4 years
- Pile Caps: 0 to 2 years
- Piles: 2 to 4 years, except where noted

West Approach

- Decking: 8 to 10 years
- Stringers: 8 to 10 years
- Pile Caps: 8 to 10 years
- Posts: 8 to 10 years
- Subcaps: 8 to 10 years
- Piles: 6 to 8 years
- Bracing: 8 to 10 years

5 Discussion and Recommendations

5.1 General

The Britannia Net Loft facility is generally in a serviceable condition. In order to understand the significance of the inspection results, a brief discussion of the factors which determine the life expectancy of timber substructures similar to the Net Loft is presented below:

- The main factors which govern the service life of the Net Loft include the internal fungal decay in the tops of piles, in the pile caps and stringers.

5.2 Deterioration Due to Fungal Decay

Decay due to fungal attack may be visible on the exterior of the wood, but it is more likely hidden and can be surprisingly extensive before it appears on the surface. Fungal growth, and eventual decay, will occur wherever oxygen and moisture can provide the environment for growth. Where timbers have been repeatedly exposed to moisture, the life expectancy of timber members can vary from between 20 to 40 years. The presence of mechanical damage also increases the likelihood of decay.

The most likely places for decay include:

- At the ends of decking, stringers, pile caps, and piles, where field cuts may have occurred, or where end checking has breached any protective treatment if applicable.
- At locations that have opened up due to checking.
- At connections where the installation of bolts or drift pins provide the entry for air and moisture and increase the likelihood for decay.
- Where the end grain of wood butts against the side grain - the end grain being more susceptible to the entry of moisture resulting ultimately in both sections becoming infected. End framing connections, and the tops of piles are obvious locations for this mode of attack.
- Where one timber member is supported over another, e.g., stringers on pile caps.

There is evidence of moderate fungal deterioration in the net loft superstructure, although the extent is not considered unusual when taking into account the size and age of the facility and the large number of timber structural elements.

6 Summary of Recommended Repairs and Estimated Costs

The Britannia Net Loft is generally in a serviceable condition. Of main concern is the extent of deterioration identified in the supporting substructure. Depending on the intended service life of the facility, it is in our opinion that repairs should be implemented within the next 18 months. It is unlikely that a catastrophic failure will occur, but we are concerned that a localized collapse is possible due to the overloading of a deteriorated pile cap or pile.

Subject to the intended future use of the Net Loft, the following should be considered:

- A cost savings may be recognized by demolishing the east approach which starts from the abutment and extends to the northeast corner of the facility.

- Upgrading of the facility to meet current building code and seismic requirements. A detailed analysis of the building or the substructure has not been completed at this time, as we are unsure of the intended occupancy requirements.

Based on the inspection findings, the following repair/maintenance program is recommended within the next 18 months:

Net Loft

- The replacement of the stringer cross bridging timbers.
- The replacement of approximately 10 lin. m of deteriorated pile cap.
- The replacement of two timber bearing piles.
- The fresh heading and installation of double corbel blocks at three pile locations.
- The realignment and strapping at one pile locations.

East Approach

- The replacement of approximately 25 m^2 of decking.
- The replacement of approximately 30 lin. m of deteriorated pile cap.
- The replacement of one timber bearing piles.
- The replacement of three corbel blocks.
- The fresh heading and installation of corbel blocks at three pile locations.

A summary of the recommended repairs, and an estimate of the costs to implement the repairs is presented in *Table 6* on the following page.

TABLE 6: Summary and Estimated Cost to Implement Recommendations

Item	Description	Estimated Cost
1	Mobilization and demobilization.	$10,000
Net Loft		
2	Replace all stringer cross bridging timbers.	2,000
3	Replace 10 lin. m of pile caps.	10,000
4	Replace two timber piles.	4,000
5	Freshead and install double corbels at three pile locations.	3,500
6	Realign and strap one pile.	500
East Approach		
7	Replace 25 m^2 of decking.	5,000
8	Replace 30 lin. m of pile caps.	15,000
9	Replace one timber pile.	2,000
10	Replace three single corbel blocks.	1,500
11	Freshead and install double corbels at three pile locations.	3,500
Subtotal		**$57,000**
Seismic retrofit of supporting structure (provisional sum).		100,000
Subtotal		**$157,000**
Contingency (25%) and Engineering (5%)		47,000
Total Estimated Cost (Excluding GST)		**$204,000**

In reviewing the estimated costs, it is important to note the following:

- The estimates are based on in-house experience with similar projects and on budget price quotations from local contractors and suppliers.
- The estimates are based on mid 2002 cost levels and do not allow for escalation.
- It is recommended that a contingency allowance of 25% of the total estimated cost should be included to cover undefined items. This contingency is not a reflection of the accuracy of the estimate, but covers items of work which will have to be performed, and elements of cost which will be incurred, but which are not explicitly detailed or described due to the level of engineering and estimating which has been completed to date. The estimate is considered accurate to ± 25%.

ATTACHMENT H.

PHOENIX GILLNET LOFT

The staff report received by Engineering and Public Works Committee on October 23, 2002 recommended for consideration in the 2003 capital program the option to make safe and secure at a cost of $138,000. In response to identifying possible cost reductions, staff have reviewed the project with the following conclusions.

Some landside fencing has now been erected for safety and security purposes and staff consider this component can be reduced significantly. Also, demolition of the west walkway, the environmental clean up and only replacing approximately 50% of the roof shingles can be deferred until the long term use of the facility is determined. Consequently staff would recommend revising the current project scope as follows:

Item	Description	Estimated Cost
1	Demolition of West Bent walkway	defer
2	Environmental Clean up and disposal	defer
3	Installation of Perimeter Fencing (previously $30,000)	$5,000
4	Roof repairs	$25,000
5	Contractor General Conditions and Overhead @ 15%	$8,250
	Sub Total	**$38,250**
6	Consultant Design Fees @ 10%	$3,825
7	Contingency @ 10%	$3,825
8	Permits, Disbursements @ 2%	$765
9	City Overhead and taxes @ 9% gross project	$4,200
	GRAND TOTAL	**$50,865**

Estimate considered accurate to ± 25%

ATTACHMENT I.

FIRE VEHICLE REPLACEMENT LOAN

The current method of funding vehicle and equipment replacement is through the Vehicle Replacement Statutory Reserve Fund which is sustained by annual budget transfers based on the replacement value, depreciation, and operating and maintenance costs for each vehicle over their useful life. Such a fund has the advantages of stabilizing equipment replacement funding, recognizing the full cost of ownership, and protecting routine replacement from the fluctuations of the annual budget process. Normally, funding decisions that involve significant upgrading of the type of equipment purchased, or expanding the size of the fleet are subject to normal budgetary decision making. However, the contribution to the reserve has not been revised in recent years to accommodate upgrading of the type of equipment purchased.

The following observations have been made regarding the present method of vehicle replacement:

- There is no established vehicle acquisition program and no departmental standard for determining the useful life of fire apparatus. Vehicles are replaced on an ad-hoc basis. The desired replacement cycle is 15 years as recommended by the National Fire Protection Association. Deferring the acquisition of apparatus in 2003 will continue this practice.

- The annual contribution to the reserve fund is insufficient to fund RFR's requirements over the next 10 years. The recent vehicle acquisition strategic plan developed by the department addresses this issue.

- Keeping an older vehicle serviceable may require increasing maintenance and repair expenditures beyond the point at which the vehicle has any significant resale value. Additionally, the apparatus due for replacement are considered obsolete and not adequate to meet the department's current or future needs. The total resale value of the 3 vehicles currently being replaced is approximately $22,000, while the replacement cost is $2.3M.

- The fund assumes replacement of the old vehicle with the same general type of new vehicle, so that only inflation is assumed to affect the purchase over time. However, advances in technology and vehicle capability add to the cost of fleet replacement.

- An alternative funding source is only required for the acquisition of the required vehicles in 2003. With the recent adjustments to the biweekly vehicle rates, the reserve fund is sufficient and capable of funding RFR's apparatus and equipment requirements after 2003 and for the next 10 years.

Consider the following risks to the City should the acquisition of these apparatus be deferred.

1. As vehicles get older, their net book value decreases while the cost of maintenance and repairs increases.

2. The reliability of RFR's fleet is reduced.

3. Acquisition of new vehicles not only increases the asset value of the fleet, but also improves its reliability, efficiency and technology. It is generally accepted that the RFR fleet requires both technological and general upgrading to meet the current and future needs of the department. The majority of the present fleet is technologically obsolete. Deferring the acquisition of these vehicles in 2003 will only serve to widen this gap.

4. Because of its age, the majority of the fleet does not meet the current safety standards established by Worker's Compensation Board, Underwriter's Labratories, and the National Fire Protection Association.

5. Reduced efficiency and effectiveness.

6. Sourcing and acquiring parts for repair becomes more difficult and lengthy, resulting in apparatus being "out of service" for longer periods of time.

Consider the following benefits to the City should these apparatus be acquired in 2003 as scheduled.

1. The average age of the fleet is reduced increasing the reliability of one more vehicle.

2. The fleet is more capable of responding to the wide variety of calls for service (fire, medical, rescue etc.) required of RFR. In other words, apparatus would be better suited to meet RFR's mission.

3. Increased efficiency and effectiveness. Current apparatus are not well suited to meet the current needs of the department.

4. Cost to maintain and repair the fleet decreases. Also, the average time that apparatus are out of service for repair is reduced as the average age of the fleet is reduced.

Note: When the Sale & Leaseback RFP was issued for the PW vehicles an article was included to reserve the City the right to include the Fire Rescue vehicles at any time. This may provide the City with an alternative if this capital request is rejected.

ATTACHMENT J.

KING GEORGE PARK CARETAKER SUITE

In the original concept of the caretaker suite, it was looked at to be a 'modular' building adjacent to the apartment complex. Upon further review with staff, and in response to the significant late night and vandalism issues at King George Park it was felt that putting the caretaker suite on the second floor of the existing washroom complex will lead to a better surveillance vantage point over the park, and economize on space used in the park proper by upgrading a single building.

The $53,000 additional amount is required to satisfy the results of the tendering process for the project which occurred in 2002 as well as to accommodate the above mentioned change in scope. We are also requesting pre-approval of these funds to initiate the building process with completion by summer 2003 to have a caretaker in place for the busy summer months.