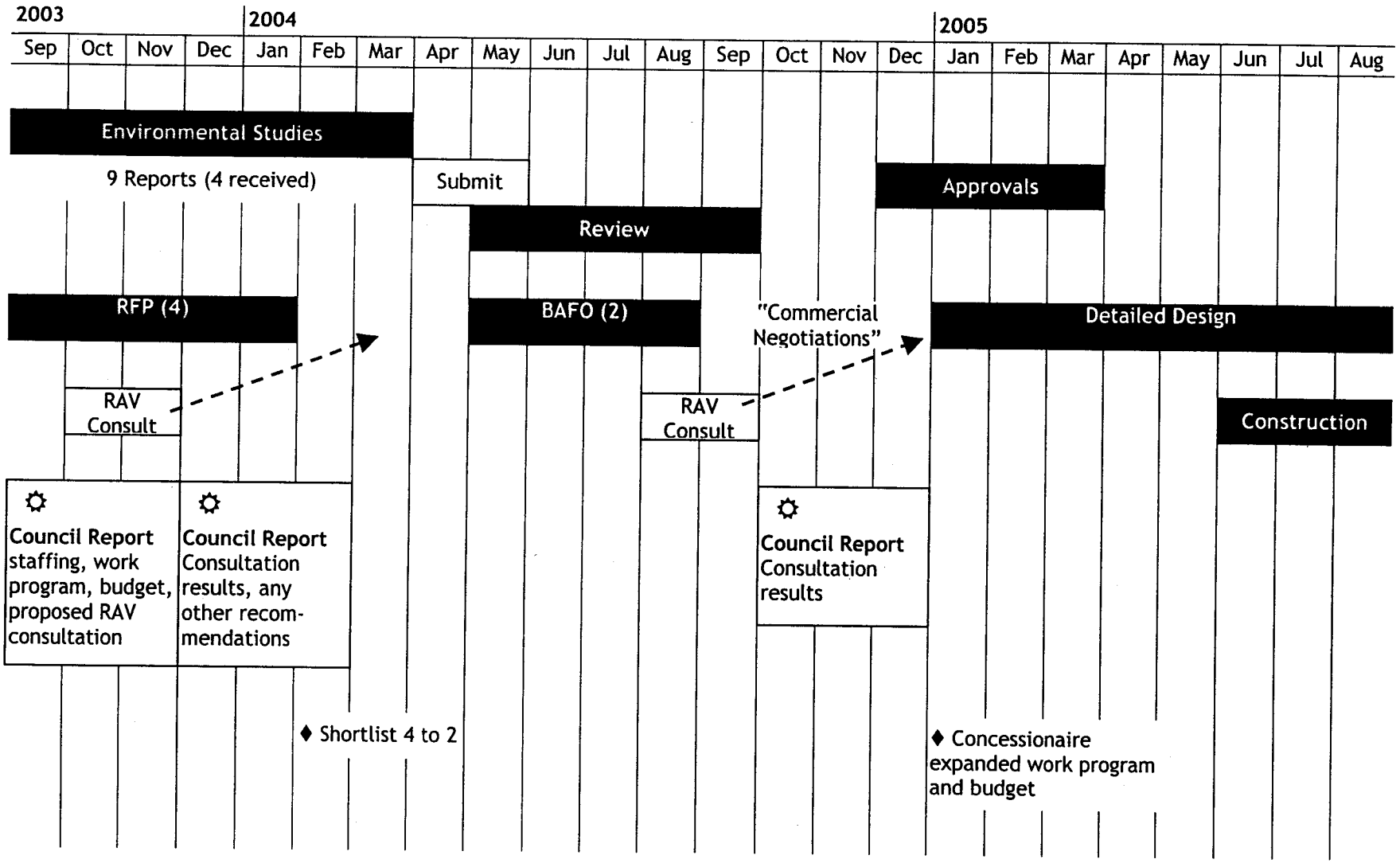
RAV - City Schedule



Appendix A

2. VOLUME B: DESIGN, CONSTRUCTION AND ENVIRONMENTAL APPROVALS

The intent of Volume B of the Proposal is to define the system that is being proposed including technology, physical configuration, E&M Systems and Vehicles. Designs need only be taken to a level that enables the Proponent to produce a "not to exceed" estimate of capital costs. Volume B of the Proposal should include design and construction information for all significant elements of the entire Project as follows:

2.1 Proposed System Design

2.1.1 Describe the specific technology upon which the system design is based.

2.1.2 Provide drawings showing the proposed horizontal alignment and the vertical profile at scales of 1:1000 horizontal and 1:200 vertically. Plans to show:

2.1.2.1 location of Stations;

2.1.2.2 location of future Stations;

2.1.2.3 location of crossovers and other special trackwork;

2.1.2.4 horizontal and vertical curve data and any speed restrictions; and

2.1.2.5 limits of right-of-way identifying the extent of property acquisition required.

APPENDIX B

2.1.3 Provide a track plan showing diagrammatically the layout of the entire system including special trackwork, Stations and other key features.

2.1.4 Provide simulations of train operations showing speed and elapsed travel time over all routes in both directions, stops at all Stations, intersection delays, and the round trip travel times. Specifically, include in the simulation, the operations at turnbacks at each terminal Station.

2.1.5 Provide calculations of the train length, fleet size and line capacities showing how the requirements for the Base Level Demand will be met over the term of the Concession Agreement, by increasing the fleet size and/or reducing headways.

2.1.6 Further show how the ultimate capacity of 15,000 pphpd can be met by either increasing the train capacity, increasing the fleet size, reducing headways and making other system modifications.

2.2 Guideways

2.2.1 Provide drawings showing the limits of proposed guideway structures along the alignment. This could be illustrated on the alignment drawing produced under Section 2.1.2. The following type of guideways are to be identified:

2.2.1.1 bored tunnel;

2.2.2 cut and cover tunnel;

2.2.2.1 open trench;

2.2.2.2 standard elevated guideway;

2.2.2.3 special elevated structures including river crossings; and

2.2.2.4 at-grade.

2.2.3 For the standard elevated guideways, indicate the proposed cross section, sideview and typical span range. The typical cross sections should include power supply elements, trackwork and support system, walkways and railings, cable-ways and any other typical features. Indicate the type(s) of substructure including columns and foundation that are proposed over the various sections of the Reference Alignment. Shallow guideways with long spans are preferred and considered to be less intrusive. Submit information describing the range of architectural treatment of the elevated guideway structures that is possible within the range of the cost estimates provided.

2.2.4 For the river crossings, show the location of piers and span lengths proposed. Provide an elevation of each crossing illustrating how the navigable clearance requirements have been met. (See also Section 2.9.6.)

2.2.5 Provide typical cross sections of bored and cut-and-cover tunnels, trench and at-grade guideways. Each section should show the system wide elements, walkways and other significant features.

2.2.6 Describe, with appropriate reference to alignment drawings, how the requirements for emergency evacuation from underground guideways will be met. For underground guideways, include the number and location of cross passages and emergency exits.

2.3 Stations

2.3.1 The objective of the Station portion of Volume B is to describe the Station location, plan and features, in particular, the entrances, circulation elements, passages and corridors, platforms and mezzanine configuration, as well as the location of ancillary areas, and traction power, transportation interface, and other related facilities.

2.3.2 The Station design portion of Volume B should include the following for each Station:

2.3.2.1 Platform Plan 1:200:

(a) overall dimensions of the physical facility including ancillary facilities;

(b) location and size of elevators, escalators and stairs (both normal and emergency); and

(c) designated waiting areas.

2.3.2.2 Grade-Level Plan 1:200:

(a) dimensional description of Station limits if other than the platform limits;

(b) entrances and all at-grade ancillary structures;

(c) limits of security and access controls; and

(d) location and size of elevators, escalators, stairs (normal and emergency) or ramps;

2.3.2.3 Intermediate-Level Plans 1:200 (if applicable):

(a) overall configuration and dimensions including that of any ancillary areas; and

(b) location and size of elevators and stairs (normal and emergency).

2.3.2.4 Site Plan 1:500 or larger:

(a) pedestrian paths and provisions within site for interface with adjacent sites;

(b) provisions for bus bays on site and adjacent to site;

(c) passenger pick-up and drop-off, parking areas (as required) and circulation within and adjacent to the site;

(d) all adjacent roads, structures, paths, developments, and amenities affected by or affecting the Station or site design; and

(e) schematic landscaping.

2.3.2.5 Longitudinal Section:

1:200 or larger.

2.3.2.6 Cross Sections:

1:200 or larger.

2.3.2.7 Narrative:

Supplement drawings with narrative information as required, including the following:

(a) brief description of the character of site and neighbourhood;

(b) rationale or basis for Station location, configuration and features;

(c) description of non-transit activity affecting Station design, basis for intermodal provisions and functional description;

(d) description of key site features such as trees and other landscape elements which must be retained or restored;

(e) special requirements relating to neighbourhood character or activity; and

(f) architectural design features.

2.4 E&M Systems

2.4.1 Describe each of the E&M Systems that will be installed including:

2.4.1.1 train control system; and

2.4.1.2 power supply and distribution system including:

(a) number and location of propulsion power substations;

(b) location of BC Hydro feeds to these substations;

(c) regeneration through braking;

(d) devices to transfer power to Vehicles and typical designs (e.g. overhead catenary and pole, third rail, etc.)

(e) trackwork including typical rail section and support structure, identifying any areas where special anti-vibration measures are proposed;

(f) surveillance systems;

(g) public address systems;

(h) telephone systems;

(i) alarm systems;

(j) supervisory control and data-acquisition systems; and

(k) other systems.

2.4.2 Describe the ventilation systems that will be installed in underground sections.

2.5 Vehicles

2.5.1 Provide details of the Vehicle proposed including:

2.5.1.1 layout showing number of seats and standing area;

2.5.1.2 how wheelchairs and bicycles will be accommodated;

2.5.1.3 how Airport passenger baggage will be accommodated, including effect on passenger capacity;

2.5.1.4 design capacity of Vehicle at 4 standees per square metre;

2.5.1.5 environmental control systems;

2.5.1.6 performance specifications; and

2.5.1.7 description of interior and exterior.

2.6 OMC

2.6.1 Provide drawings showing the proposed layout of the OMC including:

2.6.1.1 administration building(s);

2.6.1.2 maintenance building(s);

2.6.1.3 wash facilities;

2.6.1.4 storage and other tracks;

2.6.1.5 control centre; and

2.6.1.6 access roads and parking.

2.7 Roadworks, Transportation Interface Facilities, Utilities and Landscaping

2.7.1 Provide drawings and sketches illustrating the extent of roadworks (new and restored) including sidewalks, cycleways and other features.

2.7.2 Provide schematic drawings of proposed landscaping along the alignment. In particular, illustrate the proposed treatment of the following roadways:

2.7.2.1 Cambie Boulevard so as to satisfy the requirement for no net loss of green space and trees; and

2.7.2.2 No. 3 Road.

2.7.3 Provide schedule of identified conflicts with existing utilities and the proposed treatment of each conflict.

2.7.4 Provide layout drawings of all bus loops to be provided by the Concessionaire.

2.7.5 Provide details of proposed at-grade operations together with the proposed treatment of all at-grade street crossings as follows:

2.7.5.1 indicate proposed treatment of crossings with respect to transit priority; and

2.7.5.2 provide simulation illustrating the operation through at-grade signal controlled crossings and the impact on vehicular and pedestrian movements.

2.8 Construction Method Statement

2.8.1 Proponents should submit a construction method statement giving a detailed description of the methods by which they propose to construct the works. The statement should including the following:

2.8.1.1 equipment to be used to construct tunnels and below ground Stations;

2.8.1.2 locations and preliminary layouts of tunnel access shafts and other temporary work areas;

2.8.1.3 outline traffic management plan(s); and

2.8.1.4 proposed method of spoil disposal.

2.8.2 A preliminary schedule for the design, construction, testing and commissioning of the work should be submitted. The schedule should be a time related network analysis diagram showing all the major activities from start to completion and their logical interdependencies. Rates of advance for tunnel construction should be shown.

2.9 Environmental Management Plan

2.9.1 The Proponents should demonstrate their understanding, commitment and approach to the environmental Permit requirements of the Project. Proposals should include the outline plans, which indicate in simple bullet format the content of the section in sufficient detail to demonstrate the Proponent's understanding of the requirements and how they will be addressed.

The outline plans must be in sufficient detail to permit the assessment of the impact of construction on environmentally sensitive areas required as the basis of applications being advanced by RAVCO under the BCEAA and CEAA.

(By the end of BAFO Stage it is anticipated that these plans will be in sufficient detail to implement, with only minor revisions.)

2.9.2 Proponents should submit an environmental management plan which includes the items listed below, with the outline plans attached as schedules:

2.9.2.1 identify the Proponent's management team members that will have responsibility for environmental and archaeological management and monitoring services, including their credentials and extent of experience in British Columbia;

2.9.2.2 air quality and dust control;

2.9.2.3 noise management;

2.9.2.4 stormwater drainage and sediment control;

2.9.2.5 habitat compensation/mitigation;

2.9.2.6 imported soil sampling;

2.9.2.7 excavated soil sampling;

2.9.2.8 solid waste management and recycling;

2.9.2.9 hazardous materials management;

2.9.2.10 spill prevention and emergency response;

2.9.2.11 training and orientation;

2.9.2.12 archaeology management; and

2.9.2.13 construction environmental management program.

2.9.3 Outline Environmental Quality Assurance/Quality Control Plan

2.9.3.1 Concessionaire's quality management team - roles and responsibilities;

2.9.3.2 testing program - for verifying quality (type of testing; testing frequency; test accuracy); and

2.9.3.3 process control.

2.9.4 Outline Landscape Restoration and Management Plan

2.9.4.1 tree removal, storage, replacement along the entire Reference Alignment, with specific emphasis on Cambie Boulevard;

2.9.4.2 overall landscape designs;

2.9.5 Outline Tunnel and Excavation Spoils Disposal Plan

2.9.6 Preliminary North Arm and Middle Arm Engineering Designs, and Staging and Erection Plan

2.9.6.1 preliminary bridge designs - alignment; pier and abutment locations; area extent of temporary and permanent disturbance; pier protection; vertical and horizontal navigation envelope;

2.9.6.2 staging and erection plan - location of staging, lay-down, fabrication areas; construction schedule, including schedule for in-river works that could affect vessel traffic; and

2.9.6.3 schedule for studies to support application under the *Navigable Waters Protection Act* including hydrology, sediment erosion, transport, deposition and opportunities for mitigation.

4.0 Design Themes

In addition to the key themes identified in the Project Definition Consultation (March 2003), the following is the list of proposed design themes for the project.

4.1 Access and Connectivity

This theme seeks advice on how the public expects to get to and use the system. It should identify issues or concerns such as parking, provisions for bicycle access, bus facilities etc. The intent is not to develop a formal access plan for each station, rather it should result in the characterization of each station by the major mode(s) of access – e.g., Pedestrian/bus/vehicle/bicycle. It should also begin to identify important connections within communities and identify how access initiatives by other agencies can re-enforce the system.

4.2 Safety and Security

This theme seeks advice on what aspects of system and facility design will assist the public in feeling safe and secure using the system. It is anticipated that the

APPENDIX C

general principles of CPTED should be articulated with specific advice from the public. Further, it should be expected that some operational issues will be raised.

4.3 Local Area Context

This theme seeks advice on what the public considers important aspects of the context surrounding stations for consideration in developing station designs. It is anticipated that some advice will be received which can be used by municipal jurisdictions in their own local precinct or area planning processes.

4.4 Urban Design between Stations

This theme will focus on urban design issues related to the urban design aspects of the alignment. It is anticipated that the south Cambie corridor, the Airport Connector and the No. 3 Rd in Richmond segments will be of particular interest. The intent is to seek input on what aspects of alignment/guideway design will contribute to best integration with the surrounding built environment.

4.5 Station Continuity and Distinction

This theme will focus on station design in terms of the elements of continuity – the system wide components – and the elements of distinction – the station specific components. The intent is to seek advice on the importance of station identity, on how station identity is best reflected in design and what general design directions should be considered in developing the design of elements which are station specific

4.6 Environmental Issues

This theme is primarily to educate participants in the consultative process in that the environmental assessment process is defined by legislation. However, it is anticipated that environmental issues will be raised.

This is an opportunity to explain the review process including the specific public consultation associated with it.

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4.7 Construction

This theme is primarily focused on community issues related to construction, in general terms.

5.0 Proposed Consultation Structure

The following sets out RAVCO's minimum expectations for the Pre-Design Phase Public Consultation. It responds to the work completed to date and reflects discussions with the three jurisdictions, City of Richmond, City of Vancouver, and YVR. It is expected that consultant proposals will expand and elaborate on this approach, in addition to providing a detailed description of a specific work plan to implement the program.

5.1 Round One – Initial Theme Response

This round focuses on obtaining initial responses to the Project Definition Consultation (March 2003) Key Themes by working with small groups – those previously identified and new groups. Through facilitated small group discussions it is anticipated that meaningful design objectives related to the themes will be articulated.

5.2 Round Two – Theme Response Review

This round focuses on disseminating the initial responses generated in round one for broad public review and commentary.

5.3 Round Three - Reporting Out

This round focuses on reporting the results of the consultation to the participants and the community, including draft design objectives for consideration by RAVCO. The draft design objectives will be provided to the proponent teams that are preparing proposals to design/build/operate/maintain the RAV system, at the BAFO stage of procurement.

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