

As part of the *Preferred Option Pre-Design Study*, construction cost estimates have been prepared. These costs include the watermain from North Vancouver to the Village, necessary upgrades to the North Vancouver water supply system to handle the additional flows, completion of the Village water distribution system, modifications to the system and the installation of water service connections to the property lines.

Costs associated with connecting the water service to private residences or modification to indoor plumbing are not included.

The Village would be eligible for Provincial and Federal funding grants to construct all portions of this project. Typically, these grants cover 2/3 of the project costs. The final 1/3 would be covered by the residents through long term debt recovery or similar financing programs. Municipalities have access to loan programs through the Municipal Finance Authority of BC (MFA). Annual cost estimates associated with debt are based on long term loans through the MFA for 1/3 of the project costs.

Each household will be metered and billed for water consumed. At the present time, no billing structure has been committed to. However, a sliding scale is probable where above-average users pay a premium rate.

### Capital Cost Summary

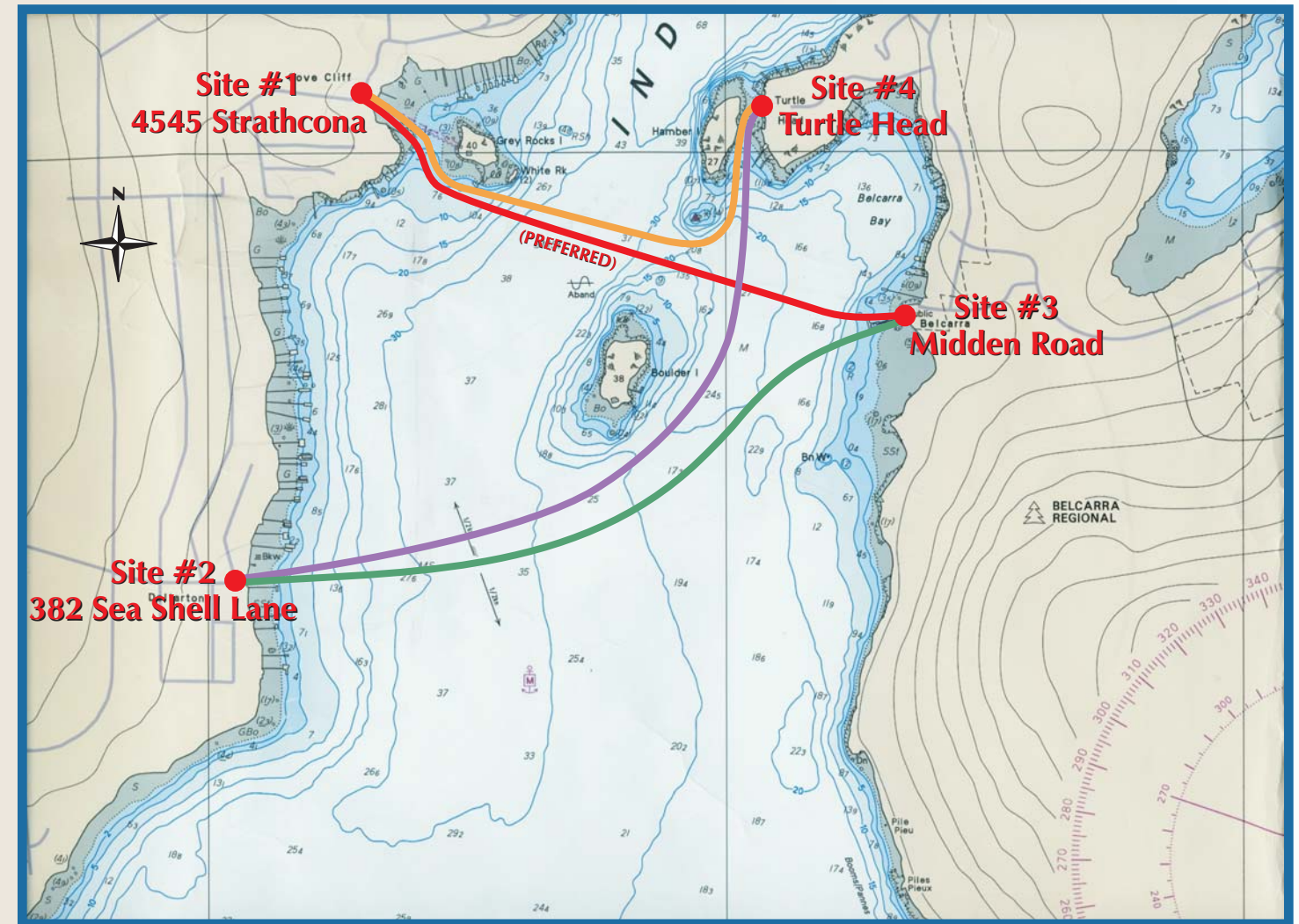
Indian Arm Watermain Crossing	\$ 2,560,300	Typical residential service connections are based on a standard 3/4" meter and service.
Village Water System Upgrade	\$ 2,195,200	
Residential Service Connections	\$ 1,076,600	Additional costs associated with oversized meters to service houses with fire sprinklers or high water demands, landscape rehabilitation or blasting are not included.
North Vancouver Upgrades	\$ 180,000	
Sub Total	\$ 6,012,100	
1/3 Cost Paid By Village	\$ 2,004,000	

### Annual Cost Estimate per Property

Year	Capital Cost Debt Servicing Total Annual Payment	Annual Water Cost per Property				Annual Debt Servicing Cost*	Typical Annual Cost
		Average Consumption 0-40 m <sup>3</sup> /month (500 L/c/d)		Above Average Consumption 40-100 m <sup>3</sup> /month (1000 L/c/d)			
		Cost of Water (\$/m <sup>3</sup> )	Annual Cost at 40 m <sup>3</sup> /month	Cost of Water (\$/m <sup>3</sup> )	Annual Cost at 100 m <sup>3</sup> /month		
2007	\$167,501	\$0.47	\$227	\$0.57	\$640	\$632	\$859
2008	\$167,501	\$0.50	\$238	\$0.60	\$668	\$628	\$866
2009	\$167,501	\$0.53	\$255	\$0.63	\$710	\$623	\$879
2010	\$167,501	\$0.54	\$261	\$0.64	\$725	\$619	\$880
2011	\$167,501	\$0.56	\$267	\$0.66	\$740	\$615	\$882
2012	\$167,501	\$0.57	\$273	\$0.67	\$755	\$611	\$884
2013	\$167,501	\$0.58	\$279	\$0.68	\$770	\$607	\$886
2014	\$167,501	\$0.60	\$286	\$0.70	\$786	\$603	\$888
2015	\$167,501	\$0.61	\$292	\$0.71	\$803	\$599	\$891
2016	\$167,501	\$0.62	\$298	\$0.72	\$818	\$595	\$893
2017	\$167,501	\$0.63	\$305	\$0.73	\$834	\$591	\$896
2018	\$167,501	\$0.65	\$311	\$0.75	\$849	\$587	\$898
2019	\$167,501	\$0.66	\$317	\$0.76	\$865	\$583	\$901
2020	\$167,501	\$0.67	\$324	\$0.77	\$881	\$580	\$903
2021	\$167,501	\$0.69	\$330	\$0.79	\$897	\$576	\$906
2022	\$167,501	\$0.70	\$336	\$0.80	\$913	\$572	\$909
2023	\$167,501	\$0.71	\$343	\$0.81	\$929	\$569	\$912
2024	\$167,501	\$0.73	\$349	\$0.83	\$945	\$565	\$914
2025	\$167,501	\$0.74	\$356	\$0.84	\$961	\$562	\$917
2026	\$167,501	\$0.75	\$362	\$0.85	\$977	\$558	\$920
<b>Total</b>	<b>\$3,350,012</b>	* Assumes number of lots increases from 265 to 300					

# Belcarra Municipal Potable Water Supply Pre-Design of North Vancouver Supply

Summary of the ongoing technical evaluation of a watermain crossing from North Vancouver



October 2006



**BACKGROUND**

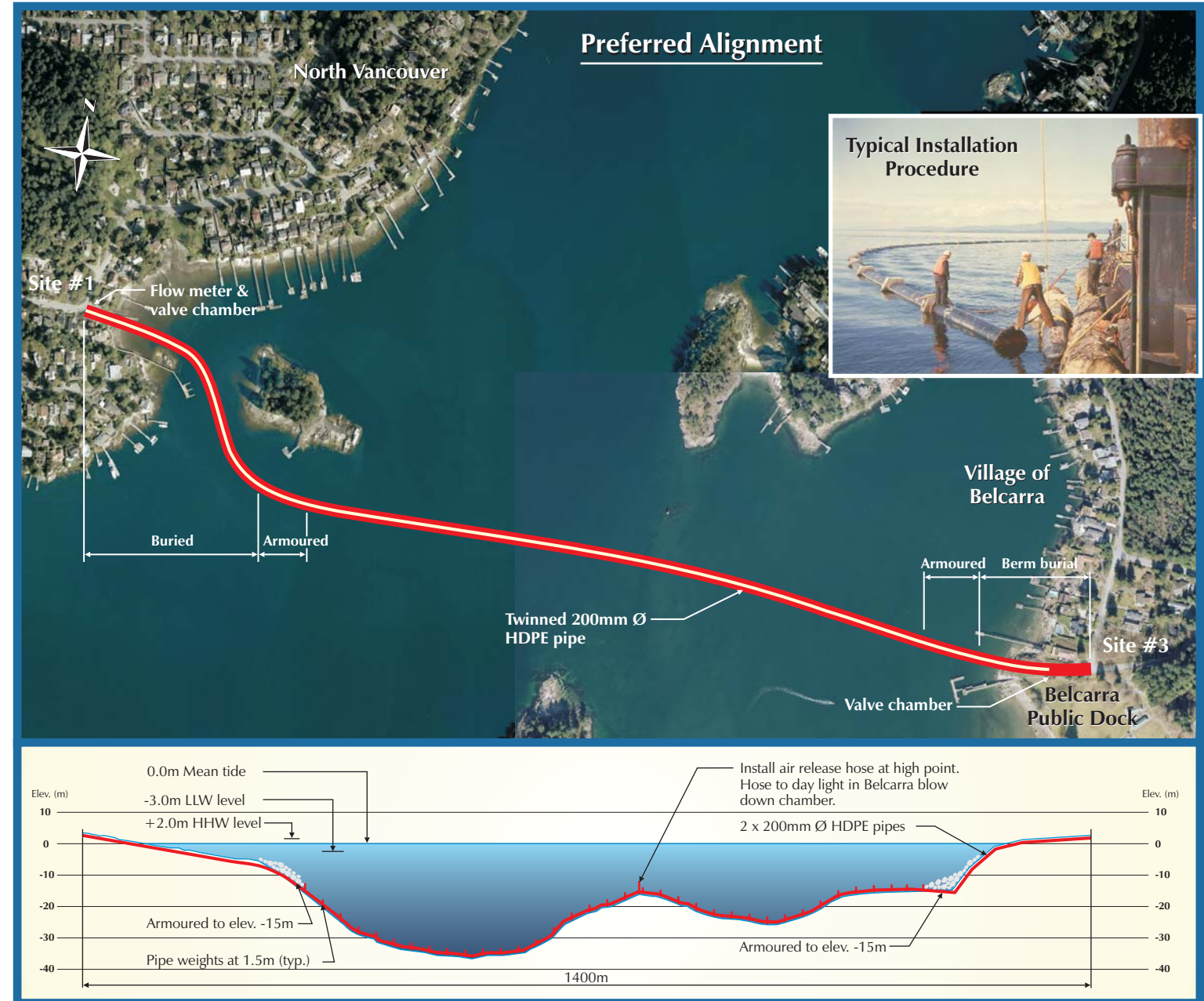
In June 2006 Dayton & Knight Ltd. finalized a report reviewing potable water supply options for the Village. The analysis reviewed local water supplies and various connections to the Greater Vancouver Water District's (GVWD) supply system. A connection to the GVWD would be through an adjacent member municipality, either the City of Port Moody, Village of Anmore or the District of North Vancouver (DNV).

It was recommended that the Village pursue a connection to the GVWD.

The Village subsequently issued a proposal for the pre-design of a water supply from the District of North Vancouver. This connection will require the construction of a submerged crossing in the shallow southern portion of Indian Arm.

The proposed crossing will likely consist of a pair of 200mm Ø high density polyethylene (HDPE) pipes placed along the sea bed. The pipes will be buried along the near shore areas for protection and visual aesthetics.

The line capacity will meet the Village's future peak day demands.



North Vancouver Marine Access

**Site #1 4545 Strathcona Road**  
**District of North Vancouver Connection**

This location is shown in the adjacent photograph. The site is a public right-of-way which has a sanitary lift station and a public dock. Soil materials near the shoreline appear to consist of mud and pebbles.

Local terrestrial watermains consist of 200mm and 150mm diameter ductile iron pipes. The local system is looped, providing improved hydraulics for the Belcarra supply.

This site is the preferred connection within the District of North Vancouver.



Belcarra Marine Access

**Site #3 Midden Road**  
**Village of Belcarra Connection**

The preferred location within the Village of Belcarra is along the Midden Road right-of-way adjacent to the GVRD Belcarra Regional Park public dock. This site is shown in the adjacent photograph.

Surface soil conditions appear to be a mixture of sands and cobbles. Rock protrusions are visible at the north side of the public dock. To minimize rock removal the watermain would be placed on the ground surface and covered to 1.8 metres with an earthen berm for protection.

The overland portion of the watermain would follow the former alignment of Midden Road.

**Village of Belcarra Water System Upgrades**

The Village's current fire protection system must be completed and modified to become a municipal water supply system. The adjacent table summarizes the required watermains which must be constructed to complete the system. These watermains will be installed in a similar manner as the existing system. A finished asphalt overlay will be used to repair the roadway.

The Tatlow Road reservoir will be utilized as the storage tank within the Village for peak hour demand fluctuations and fire flow requirements. A pressure reducing valve (PRV) will be constructed near Midden Road to regulate the pressure between the North Vancouver and the Village systems.

Each house will require a water service connection, including a water meter and shut-off valve. As part of this project, a service connection and meter box will be installed, ending at the property line. Homeowners will be required to connect the water supply from the property line to their residence.

PROPOSED BELCARRA WATERMAINS				
Dia.	Road	Start	End	Length
200mm	Bedwell Bay Road & Midden Road	Belcarra Bay	West Road	1050m
200mm	Bedwell Bay Road	North of West Road	Main Avenue	710m
200mm	Main Avenue	Bedwell Bay Road	Tatlow Road	430m
200mm	Kelly Road	Bedwell Bay Road	Marine Avenue	250m
200mm	Bedwell Bay Road	Senkler Road	Last property	180m
200mm	Senkler Road	Bedwell Bay Road	Sasamat Lake turn off	60m
200mm	Marine Avenue	End of pipe	Bedwell Bay Road	150m
150mm	Whiskey Cove Lane	Belcarra Bay Road	End of road	75m
150mm	Coombe Lane	Whiskey Cove Lane	Last property	340m
150mm	Salish Road & Robson Road	Belcarra Bay Road	End of road	175m
150mm	Turtlehead Road	Belcarra Bay Road	End of road	475m
150mm	Watson Road	Belcarra Bay Road	Last property	150m
150mm	Senkler Road	Belcarra Bay Road	Last property	200m
150mm	Main Road	Tatlow Road	Last property	430m