

APPENDIX F

Updated EAC Action Plan Table

#	Task / Goal	How	Why?	Resources	Est. Cost	Schedule	Start
PLANNING							
1	Produce terms of reference for an integrated Long Term Shoreline Planning Document for West Vancouver	Commence discussions and prepare plan of action.	To provide a direction and focus for the West Vancouver and its Public Waterfront.	EAC, Council, Staff, Volunteers.	In kind	Complete	2004
2	Improve knowledge of near- shore sediment pathways and related biological communities	Aerial and video data complemented with diver towed sled survey with interpretation.	To define shoreline processes and loss points to guide planning and design.	Biologist/Eng Diver Consultant for survey and report.	\$15K	Complete	2004
3	Obtain historic survey data and air photos for near-shore.	Consolidate from all known sources	To quantify and benchmark incremental long term change.	Worksheets from CHS, GVRD, BIEAP, DFO	Minor	Complete	2005
4	Review/refresh 40 year commitment to assemble continuous public seafront from Dundarave to Ambleside Beach.	Council, municipal staff	Private and municipal seawalls and intrusions continue to impact the natural shoreline. A vision of the final form of the shoreline could facilitate recovery to a natural beachscape over time	Council and staff time. And/or consultant	? 10K depending on scope	Complete	2005/2006
5	Review District budgetary framework and how structure could be limiting an integrated approach to the Waterfront.	Review any stovepipe issues/ restrictions on developing multi-year integrated approaches versus project by project.	To address the fact that the Shoreline is a system that does not recognize artificial boundaries whether physical or bureaucratic.	Staff/ Council Committee	Effort and time	Complete	2005
6	Review and table all reports for planning of existing shoreline public spaces and structures.	Consultant, volunteers, staff	To table the current foundations for long term planning. To review the "plans for planning". To ensure linkage to District databases such as the GIS.	Consultant \$5K?	Paper record gathering from DWV	Complete	2005
7	Review desirability of removing "legacy" seawalls on public beachfront	Consultant, staff	To reverse artificial impacts and losses of beach front and return to a natural state.	Restore shoreline, demolish seawalls at house demolition /deposit back shore material.	Minor	Complete	2005
8	Determine link of public waterfront to viable village economy such as cafes restaurants, sidewalk, etc.	Planning Staff, business community	To consider the synergies between public enjoyment of the seafront and desired services	PAC, Muni, Chamber of Commerce	\$20K	Complete	2004
9	Enhance wave models for Seawalk to examine near-shore interactions such as submerged tombolo, protective effects of sub-tidal boulders and kelp.	Determine what potentials and conceptual options.	To minimize long term cost of storm damage and restore enhance nearshore habitats to compensate for littoral impacts.	Original Consultant to amend past model. \$5K	\$20K	Complete	2007
10	Obtain detailed characterization of biological communities, fish, bird, plant...	Prepare terms of reference for studies..... Identify, engage volunteers, partner, agencies, universities, and staff to carry forward.	To benchmark current populations, mitigate or reverse human impacts and understand limiting factors.	Staff volunteers, DFO, CWS to determine terms of reference. Partner funding or academic involvement?	Incremental and partnered	Ongoing	2005
11	Review Beach replenishment, historic, ongoing and supplemental	Example: what is present day volume of Ambleside Beach versus 1985	To reduce maintenance costs and improves quality and stability of existing beaches.	Review long term trend and annual maintenance plan. Consultant?	\$5K	Ongoing	2005
12	Itemize historic and projected expenditures for coastal operations such as beach replenishment, storm damage etc.	Review historic costs and future projections. Review designs to mitigate or respond with forethought.	To highlight net costs and potential cost savings.	Municipal records.	Part of municipal capital plans.	Ongoing	2005
13	Establish survey references to enable determination of long term changes shorelines from HWL to LWL and nearshore area.	Survey beach profiles on recurring basis to a high level of accuracy... Request Provincial LIDAR surveys.	To enable awareness of incremental shoreline losses ... Link to District GIS which currently has no data past the shoreline.	Municipal survey crews and/or partners BC, DFO, GVRD. Detailed "profiler" nearshore hydrographic PWGSC	Staff time Partner funds? \$20K	Ongoing	2006
14	Enhance public appreciation and understanding of the shoreline processes and values.	Research content and provide displays along sea- walk such as creek outlets, tidal features, "what bird is that" posters etc.	To inform, educate and provide enjoyment to sea-walkers. Note: Creek signage item in Seawalk contract was not actioned.	Volunteer or staff time to research interpretive signage. Funding to implement signage.	\$5K	In Progress	2012
15	Identify desirable short term minor waterfront maintenance items. I.e. Minor works, rock placement, planting, beach preservation.	Observe and note for consideration/ Implementation.	To identify and plan for action	Volunteers, staff, consultants.	\$5K typical per item.	Annual	Fall 2012
16	Review infrastructure such as piers, outfalls, stream discharge box culverts, jetties and	Engineer/ Biologist team in consultation. Consolidate historic reports and fit into larger context.	To have a plan in hand. To direct maintenance funding towards long term improvement rather than simple replacement.	Muni staff, volunteers, private consultants.	\$10 K	Annual	Fall

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	ramps and identify issues, costs, future potentials.						2012
17	Table long term capital plans for shoreline infrastructure projects.	Review known projects such as repairs or rebuilds of outfalls, jetties, wharves, ramps, floats, seawalk, etc	To enable early warning and fitting in to an integrated shoreline plan for better outcome and lower cost.	Consultant \$5K, Staff, EAC	\$5K	Annual	2012
18	Estimate long term beach profile change	Review historic surveys, pictures of storm sewer pipe out-lets and other sources	To identify long term change	Muni staff to recover files, consultants/ vol's to review.	\$5K	Ongoing	2006
19	Determine values of enhanced natural shoreline to liveability of Ambleside and Dundarave	Planning Staff discussion and review. Real estate appraisers.	To "crystal ball" the dynamics and multipliers stemming from having a well planned and accessible public waterfront adjacent to high density residential areas.	PAC, Muni Staff, consultants?	\$20K	Future	2013
20	Review boat access points to waterfront for drop offs and pickups and no barrier access for kayakers.	Review transient floats and Piers, boat ramp, yacht club usage and deficits	To provide for safe, reliable, low impact Access by boat to West Vancouver shoreline.	PAC, recreational users, yacht club	\$5K	Future	2013
21	Examine enhancement /maintenance waterfront for drop offs and pickups and no barrier access for kayakers. Beach and Ramp	To examine cost effective options for improvement Piers, boat ramp, yacht club usage and deficits	Consider configuring armour rock to drift sill, enhancing habitat under wharf, addressing ramp/float infill etc. Access by boat to West Vancouver shoreline.	Staff, coastal engineer, biological consultant Users, Yacht Club.	\$3K	Future	2005
22	Prepare strategic plan and budget for 2013	Engineer / biologist team in consultation, review SPP 2011-2014 and works to 2012 and identify new projects	To continue SPP work in strategic and focussed manner, to identify areas that require immediate attention/would provide greatest benefit.	Staff, coastal engineer, biological consultants	\$3K	Future	Fall 2012
23	Prepare complete report on sediment budget and patterns from creek watersheds to final accretion terminus.	Academic Study	To establish shoreline regimes to high level of detail	University research grant for grad student?	\$15K	Future	2013
24	Prepare complete report on bird values and utilization of shoreline	Academic or CWS Volunteers	To establish relationships of shoreline attributes to visits by migratory and over wintering aquatic birds.	Copy current CWS/BCIT program \$300 per student?	\$2K	Future	2013
25	Project future beach nourishment needs at Ambleside	Review original design and estimate rates and pathways of change/loss.	To quantify losses and inputs and plan to minimize long term cost and maximize habitat values.	Muni staff to table files, volunteers or consultant review.	\$2K	Future	2013
26	Establish shoreline "risk zone" for wave/debris damage or inundation.	Consolidate and validate design storm wave, long term maximum sea level, tsunami zone.	To improve design guidelines and enable long term tuning / validation and awareness of sea level rise effects.	Consultant and/or students with data from municipal staff.	\$10K	Future	2013
27	Review Significance of sea level rise	Review impacts to date and for 100 years	To plan ahead for shoreline impacts and planning	Consultant	\$5K	Future	2013
28	Define anticipated Tsunami Inundation Zones along Shoreline	Define, mode of anticipated waves and inundation limits	To be aware of inundation zones and take mitigating planning decisions for the long term	Collaborative study with Fed Science Resources, Province PEP.	\$1K?	Future	2013
29	Review SPP 2008-2014, evaluation of current status and assessment of projects. Formulation of SPP 2014.	Reviewing previous documentation, work plans and survey results. Collation of data, and analysis of current status and future directions.	To update the Action Plan and focus for West Vancouver and its Public Waterfront.	Consultant. Paper review. Municipal staff and review for actioning by council.	\$5k	Future	Fall 2014
ACTION							
30	Address impacts of the beach- embedded armour rock at McDonald Creek. Noted in 1977 Bauer report.	Re-arrange existing rocks to reduce impacts. Re-position to enhance stream braiding and retain beach sediments in upper beach transport zone.	To restore enhanced habitat and beach sediment process and reduce artificial channelization of flow, nutrients and sediment to deep water with resulting losses to upper beach longshore processes.	District forces	\$2k	Complete	2005
31	Investigate potential for free rock supply from Sea to Sky Highway work	Staff liaise with Province and Contractors and EC Ocean Disposal Branch	Potential beneficial use of rock that might otherwise be ocean dumped.	Staff/ consultant	\$0	Complete	2005
32	Capilano and Totem Groyne Enhancements	Extension of seaward end of groynes using reclaimed rock.	To create a stable toe at Ambleside trapping near shore sediments and creating intertidal habitat.	Consultants / Contractors / Municipal Staff	\$7k	Complete	2006
33	Ambleside Pier Enhancements	Stabilize near shore sediments and create subtidal habitat at Ambleside Pier	To create a stable toe at and prevent the over-full beach from leaking into the boat access area. To create intertidal and subtidal habitat.	Consultants / Contractors / Municipal Staff	?\$600	Complete	2006
34	15 th Street Shoreline Enhancements - Repair/remove outfall pipes	Create a naturalized pedestrian footpath and riparian habitat. Placement of rock mound tombolos along the intertidal zone to trap sediments along the upper shore. Demolish upper pipes and remove broken concrete pipes	To improve the continuity of the sea walk and replace the existing parking lot diversion. Improve access to the beach. Riparian and intertidal features stabilize the upper shore and increase biological productivity. Removal of culverts improves aesthetic value and brings fresh water flows higher up the shore to enhance inter-tidal habitat.	Consultants / Contractors / Municipal Staff / District forces	?\$45k	Complete	2006
35	Lawson Pier Shoreline Enhancements	Placement of rocks to provide wave protection for the upper shore and pier and stabilize fine sediments.	To improve sediment transport to the beach east of Lawson Pier, reduce erosion and create intertidal habitat for various species.	Consultants / Contractors / Municipal Staff	\$8k	Complete	2006

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		'Opening' of the pier structure to allow leakage of sediments across the site.					
36	Lawson Creek Shoreline Enhancements	Improvement of creek for fish habitat and sediment retention. Replacement of seawall with soft shoreline protection measures. Creation of tombolos to trap sediments and create intertidal habitat and construction of a footpath and bridge.	To improve public access across the site and to the beach, and improve the continuity of the Seawalk . Reshaping and restructuring of the creek improve the habitat for spawning salmon and trap sediments on the upper shore. Tombolos and wave trips provide improved protection, reduce erosion and create habitat.	Consultants / Contractors / Municipal Staff	?\$1.5k	Complete	2006
37	18 th Street Shoreline Enhancements	Restructuring the existing riprap sea wall to create intertidal wave protection and sediment traps, and create space for extended salt marsh habitat pockets.	Replacing the hard faced seawall with soft shoreline protection measures reduces wave impacts to the seawall the risk of over-topping and erosion. Intertidal structures also create valuable habitat for barnacles, mussels and rockweed and salt marsh habitat pockets improve the biological productivity and aesthetic value of the site.	Consultants / Contractors / Municipal Staff	?\$2.5k	Complete	2006
38	Navy Jack Point (Phase 1) Shoreline Enhancements	Placement of reclaimed rock to build an intertidal drift sill, creating a stable toe to prevent erosion, reduce wave impacts to the upper shore, and create habitat.	Creation of an intertidal drift sill stabilized near shore sediments and provided improved wave protection for the seawall at an exposed point. The drift sill provided stable habitat for marine species to colonize.	Consultants / Contractors / Municipal Staff	?\$1k	Complete	2006
39	27 th Street Shoreline Enhancements	Use of rock and planted salt marsh to replace the vertical sea wall and elevate the upper shore. Creation of a subtidal kelp reef, and day-lighting of a sub-surface water flow to create a creek and riparian habitat.	Replacement of the vertical sea wall with soft shoreline protection improves wave protection for the adjacent property, reduces erosion and promotes sediment retention on the upper shore. The creek and riparian habitat will provide biological material and nourishment to the foreshore and subtidal reef will create habitat for kelp and fishes.	Private funding from property owners. Consultants / Contractors / Municipal Staff	N/A	Complete	2008
40	28 th Street and Rodgers Creek Shoreline Enhancements	Removal of seawall and addition of boulders to roughen shoreline and create a riparian habitat bench. Placement of wave trips, habitat boulders and tombolos along the shore. Elevation of creek mouth using a lower intertidal berm.	Installation of soft shoreline protection provides improved wave protection, reduces erosion and promotes sediment retention. Returning the shoreline to a more natural and historical state. Intertidal boulder features provide habitat for various marine species and improvement of the creek mouth prevents channelization, disseminates the fresh water flow and creates a staging area for spawning salmon.	Private funding from property owners. Consultants / Contractors / Municipal Staff	N/A	Complete	2010
41	Ferndale Avenue (Phase 1) Shoreline Enhancements	An intertidal berm was created using large rock which was backfilled with cobble and covered with native materials. Wave trip boulders were strategically positioned in front of the sea wall.	The creation of the berm and wave trips provides improved wave protection for the sea wall and upper shore, prevents erosion, and traps sediments. The berm creates a gentler sloping shoreline and improves sediment transport along the site. Boulders positioned at the lower edge of the berm create habitat for algae, invertebrates and fish.	Private funding from property owners. Consultants / Contractors / Municipal Staff	N/A	Complete	2007
42	Nelson Avenue Shoreline Enhancements	Excess woody debris was removed and boulders were positioned along the upper shoreline. Dune grass was planted around the boulders.	Removing the woody debris improved public access along the shoreline and the specially placed boulders provide improved wave protection and deflect excess debris from accumulating.	Private funding from property owners. Consultants / Contractors / Municipal Staff	N/A	Complete	2010
43	Horseshoe Bay Shoreline Enhancements	Large rock was placed in the intertidal and subtidal zone adjacent to the wave deflection wall for increased wave protection for the shoreline. Wave trips and cobble berms were positioned along the beach and imported sand was used to elevate the upper shore. Large boulders were used to deflect the culvert out flow.	BC Ferries compensation package for works undertaken at HSB terminal - to prevent erosion, stabilize beach sediments and enhance habitat Subtidal/intertidal habitat for kelp and fish and intertidal habitat. A kayak access point was created and creek flow was directed laterally to reduce scouring and promote sediment retention.	Private funding from BC Ferries. Consultants / Contractors / Municipal Staff	N/A	Complete	2009
44	Navy Jack Phase 2. Expansion of sandstone promontory (350m W of Navy Jack Point) with boulders, to form shallow sloping islet.	Rocks transported from British Properties and placed by excavator from barge. DFO authorization application underway.	Stabilize and trap near shore sediments thereby increasing the beach profile, creating stable intertidal habitat.	Consultants and contractor to plan and conduct works.	\$26,000	Complete	2011
45	Obtain shoreline specific aerial photography.	Add specific requirements to generic photography	To obtain best detail by scheduling for clear water, low tides.	Modify generic contracts and/or spot photography by others	Nominal	Ongoing	2012
46	Obtain video and photo records of storm events past and future.	Task volunteers and staff	To improve theoretical design parameters such as storm waves.	Volunteers, staff, residents of water-front high-rises.	In kind	Ongoing	2004
47	Monitoring and Survey work	Biophysical mapping of the shoreline and quantification of biological communities and substrate using standardized techniques (total station, dGPS, transects	To monitor changes to the physical structure of the beach and biological communities to provide measures of success of shoreline enhancement works, document historical changes and trends, detail improvements	Consultants. Biologists/ Engineers/ Divers	\$20,000 annual	Ongoing	2006

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		photography). Use of historical data for comparison.	and areas in need of tuning and to direct future project works.				
48	Ferndale Berm Expansion (as shown in 5321-D-11.1)	Creation of large rock berm along intertidal zone, backfilled with cobble and covered with native materials	To elevate upper shore and create wave protection for sea wall, reducing wave erosion of beach and creating space for riparian habitat to replace hard sea wall.	Private funding from property owners. Consultants and contractors.	Privately Funded	Ongoing	2011
49	Create short term storage site for donated materials at foot of 24 th	Suitable site has been identified, needs to be prepared for storage (vehicle access, etc).	To enable DWV to take advantage of donated materials as they become available, reducing costs and enhancing the scale of projects	District - communication with Engineering and Parks depts. as well as contractors	Inc. Marr Creek Project	Future	Spring 2012
50	Marr Creek Intertidal Reef	Placement of boulders in low intertidal zone to create crescent-shaped reefs (mirroring curve of seawall).	Create wave protection for the sea wall and trap sediments from Marr creek on the upper shore to supply Navy Jack Point. To create productive intertidal habitat for algae and invertebrate and stabilize sediments to protect near shore sediments eelgrass beds	Municipal staff, consultants to design replacement enhancement features, contractors.	\$30,000	Future	Spring 2012
51	Lawson Park Riparian Enhancement	Reshaping the pathway between Lawson Pier and Lawson Creek bridge, replacing the existing angular rock with river boulders and expanding the riparian zone.	Increase biodiversity, improve aesthetic value for the public and provide better protection for the park and pathway from waves and inundation. While construction work underway at house to minimise inconvenience.	Consultants and contractor to plan and conduct works.	\$25,000	Future	Winter Spring 2012
52	Navy Jack Point Shoreline Enhancement (Phase 3)	Include sub- and inter-tidal works to east of Navy Jack Point.	Improve wave protection for vulnerable upper shore. Reduce long-shore drift to lessen the impacts of erosion and soften the shoreline over time. Provide substrate for kelp and habitat for marine life.	Consultants and contractor to plan and conduct works.	\$25,000	Future	Summer 2012
53	Lawson Creek to McDonald Enhancement and Tuning	Placement / relocation of tombolos along the mid and lower shore. Expansion of riparian zone and salt marsh habitat along the upper shoreline.	Enhance efficacy of existing pilot project features and widen the shoreline by trapping sediments on the lower shore.	Consultants and contractor to plan and conduct works.	\$25,000	Future	Summer 2012
54	McDonald Creek Intertidal Reef Extension	Placement of large rock to extend the existing intertidal reef located on west side of McDonald Creek.	Provide increased protection for the Seawalk and beach to the east of the site and create increased stable intertidal habitat for invertebrates, fish and birds.	Consultants and contractor to plan and conduct works.	\$20,000	Future	Fall 2012
55	Ambleside and 15th Street shoreline enhancement	Creation of tombolos to continue step configuration from Lawson pier. Extend subtidal rock spurs at Ambleside pier.	Tombolos provide wave protection and trap sediments to rebuild area east of Millenum Park. Subtidal spurs stabilise upper shore and create habitat.	Consultants and contractor to plan and conduct works.	\$10,000	Future	Fall 2012
56	Larson Stream Enhancement	Opening and Enhancement of Stream mouth at foreshore for salmon and other wildlife. Use of logs, rocks and sediments to create habitat features.	Improve creek access for salmon and other fish by creating meanders, riffle pools and shade.	Consultants and contractor to plan and conduct works.	\$20,000	Future	Spring Summer 2012
57	Lawson & Dunderave Pier adjustment	Adjustment of pier framework, creation of a bypass or section removal to allow sediments to move across site.	To improve sediment supply across the shoreline by removing two significant blockages and restoring natural sediment pathways. In short term sediments may be removed from overfull beach at Dunderave .	Municipal staff, consultants to design replacement enhancement features, contractors.	\$1,000,000	Future	2013>
58	Navy jack Elevation Change	Rock material placed between -5 and -20m water depth to raise the -7m contour to -4m elevation	To widen the beach and increase the beach profile stabilizing the shoreline, providing wave protection for the sea walk and subtidal habitat for kelp.	Municipal, donations of materials and equipment. Consultant and contractor	\$75,000	Future	2012>
	Navy Jack to Dunderave Drift Sill	Construction of 2m high boulder/cobble drift sill along the -4m depth contour	To trap sediments near shore sediments increasing the beach profile and creating wave protection for the sea wall and intertidal habitat and subtidal kelp habitat.	Municipal, donations of materials and equipment. Consultant and Contractor	\$60,000	Future	2012>
59	Lawson Pier Subtidal Contour Alignment	Rock material placed between -5m and -15m to realign the -5m contour	To widen the beach and increase the beach profile stabilizing the shoreline, providing wave protection for the sea walk and subtidal habitat for kelp.	Municipal, donations of materials and equipment. Consultant and contractor	\$75,000	Future	2012>
60	Investigate future islets at Lawson Pier and/or 22nd Street and ocean-loop heat exchange system	Creation of subtidal or intertidal islets to house an ocean-loop heat exchange system, habitat and public amenities. Review potential uses of islet as public space, wildlife refuge, infrastructure).	To create substantial wave protection for shoreline reducing longshore drift and wave damage and stabilize near shore sediments over extended range, elevating beach profile. Creation of valuable kelp and rockfish habitat, intertidal habitat and potential salt marsh / bird habitat. Provision of renewable, low grade energy source for local communities establishing	Provincial and federal funding for energy conservation project. Fortis to consult and fund (?) Ocean-loop system. Municipal staff to coordinate public space infrastructure implementation and public planning.	\$1,500,000	Future	2012