



Earthquake Preparedness Strategy

2017 Update

Oct 17, 2017



Overview

- Background
- Initiative Highlights
- Summary



Council Directed Initiatives

- Started seismic upgrades to bridges
- Dedicated fire protection system
- Canada Task Force 1 - Heavy urban search & rescue team
- Emergency supply containers
- Emergency operations centre

Development of the Earthquake Preparedness Strategy

Concurrent implementation of Quick Win initiatives

Strategy adopted by Council in Dec 2013

Strategy Implementation

- Public Events
- Disaster Support Hubs
- Vancouver Volunteer Corps
- Cont. Bridge Upgrades
- Hardening key components of water system
- Emerg. Transportation Plan for Downtown
- Seismic Review of City Facilities & Upgrades
- Training & Exercises

2017 Highlights

- **Resilient Neighbourhoods Program**
- **West Annex Seismic Upgrade and Earthquake Early Warning System pilot**
- **Private Building Seismic Mitigation Program**
- **Emergency Management Information System**

1990-2010

2012-2013

2014-2016

2017



Earthquake Preparedness Strategy

Volunteers and Community

- Community Resilience
- Vancouver Volunteer Corps

Critical Services and Infrastructure

- Water & Sewer Systems
- Transportation Systems
- Communications and Information
- Training and Operations

Buildings

- Civic Buildings
- Private Buildings

Volunteers and Community

Goal: A resilient community where individuals, families, businesses, and organizations work together to prepare for, respond to, and recover from earthquakes.



Key Accomplishments 2017

- Business and Employer Emergency Preparedness guide
- Resilient Neighbourhood pilot workshops
- Vancouver Volunteer Corps Deployments

What We're Working On

- Development and launch of Resilient Neighbourhoods program
- Development of an earthquake risk awareness and risk reduction web platform – collaboration with Natural Resources Canada





Business and Employer Emergency Preparedness guide

Guide to help small businesses
prepare for emergencies

- Guide
- Plan
- Mini-plan

Available on vancouver.ca

<http://vancouver.ca/home-property-development/business-emergency-safety.aspx>





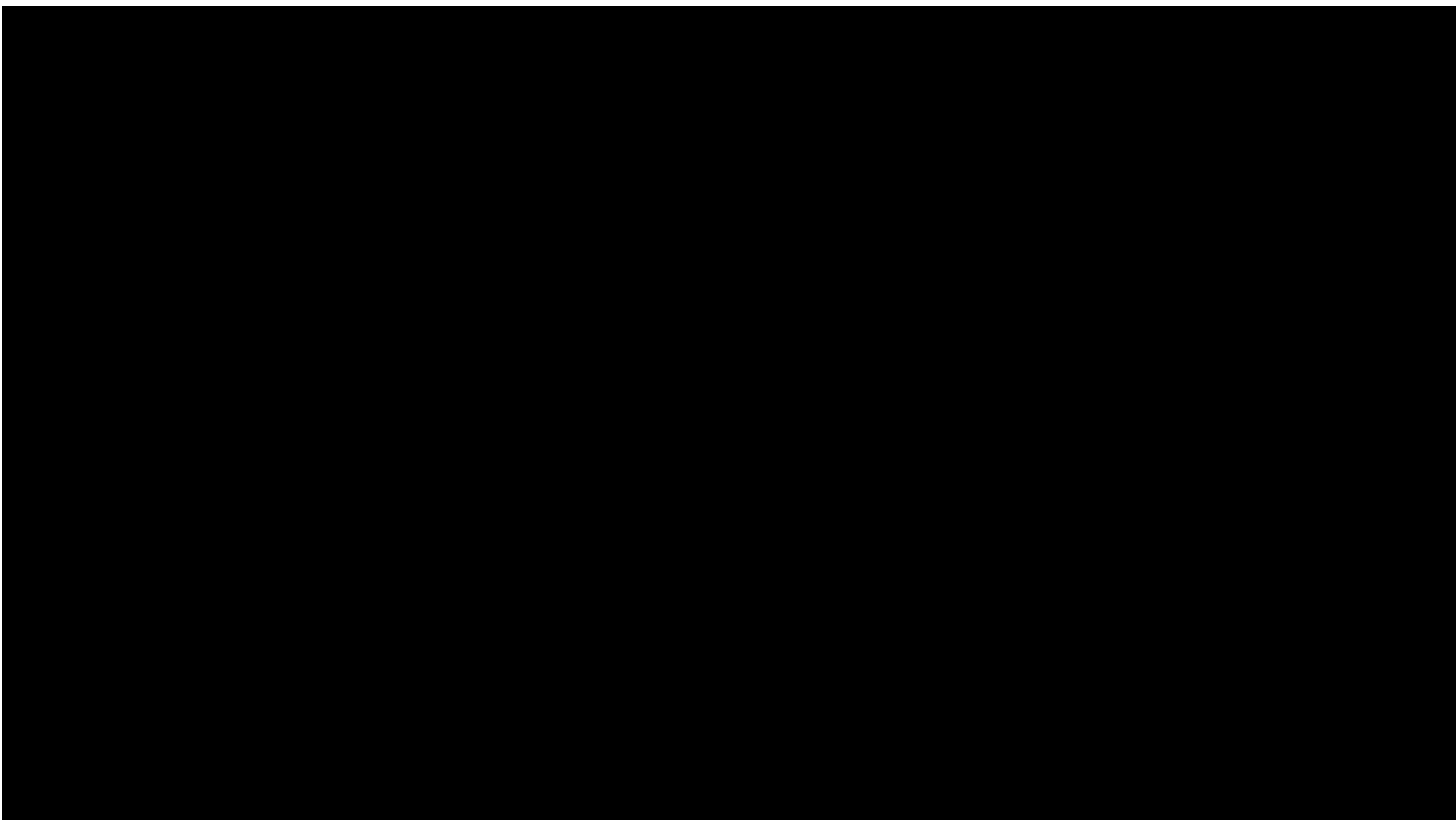
Resilient Neighbourhood Pilot Workshops

- Hosted three pilot workshops with over 100 community stakeholders
- Connections made between organizations and individuals who are continuing to work together at the neighbourhood scale
- Collaboration between San Francisco and Vancouver





Resilientville Workshop Video



Launching Resilient Neighbourhoods Program

- Based on learnings from pilot workshops, Resilient Neighbourhood Program being developed and piloted in collaboration with four key community partners.
- Partners committed to leading this work in their neighbourhoods and sharing their learnings city-wide.
- Funded through CoV Innovation Fund and external partners.





Earthquake risk awareness and risk reduction web platform

- Launching a collaboration with Natural Resources Canada to develop earthquake risk web-portal
- To be piloted with community in 2018

Objectives:

- Enhance local understanding of risk and potential consequences
- Compare range of risk reduction options and tradeoffs
- Support informed community dialogue
- Enable evidence-based decision making



Vancouver Volunteer Corps

- A team of citizens who respond to emergencies in the City of Vancouver and support public safety initiatives at civic events
 - Emergency Social Services (ESS)
 - Neighbourhood Emergency Assistance Team (NEAT)
 - Emergency Communications (VECTOR)
 - Neighbourhood Emergency Preparedness Program (NEPP)

Over 7,000
volunteer hours
of training,
response, and
special event
activations in 2017

Vancouver Volunteer Corps – 2017 Activations

- Warming Centres
- BC Wildfire Response
(Prince George, Kamloops, and Chilliwack)
- Over 30 Emergency Social Services call-outs supporting over 250 evacuees
- Canada Day, Celebration of Light, Pride Parade, Santa Claus Parade, and New Year's Eve events



Critical Infrastructure and Services

Goal: To ensure our critical infrastructure is resilient, and we are prepared to coordinate overall response and recovery efforts.



Key Accomplishments 2017

- Conducted assessment of City-owned groundwater wells for irrigation and emergency use
 - safe yield volumes
 - condition of wells
- Continued hardening of water distribution system

What We're Working On

- Conduct upgrades to groundwater wells (as recommended by assessment report)
- Development of Regional Temporary Provision of Water Guide for Municipalities (collaboration with Regional Engineering Advisory Committee)





Key Accomplishments 2017

Response Planning

- Developed Bridge Post-earthquake Inspection Guides

Risk Assessment

- Dunsmuir Viaduct seismic assessment complete (High Risk)
 - Seismic upgrading not economically viable. **Replacement structure recommended.**
- Completion of seismic assessment and retrofit development concept for 4 bridges

Resilient Design (NEFC)

- Updated seismic design criteria for new infrastructure in NE False Creek

What We're Working On

- Training staff on Bridge Post-earthquake Inspection Guides
- Further refine bridge network risk assessment with next level of detailed assessments
- Resilient connections to downtown - Georgia ramp and new Pacific Blvd designed as lifeline structures with integration into earthquake strong motion sensors network





Bridge Network High Level Risk Assessment

- Screening level assessments completed
- Detailed assessments for Granville, Cambie and Grandview Viaduct complete
- Previously completed seismic upgrades to Burrard, Granville & Grandview Viaduct

Bridge Risk Assessment Overview

Seismic Risk Priority	Major Bridge	Minor Bridge	Pedestrian Bridge	Total
Higher	4	5	2	11
Medium	1	10	3	14
Lower	1	9	8	18
Totals	6	24	13	43

Works recommended for 2019-2022 Capital Plan:

- **Cambie:** detailed assessment and upgrade
- **Granville:** completion of seismic base isolation of steel span. Shelf-ready design.
- **Georgia & Dunsmuir Viaducts:** demolition and replacement of Dunsmuir Viaduct. Upgrading not econ. viable.
- **Burrard and Grandview Viaducts:** re-evaluation of seismic design



Bridge Connections to the Downtown Core



Burrard Bridge

AADT	50,900
Seismic Risk Priority	Lower
Past Seismic Upgrades	1993 - \$1.8M 2000s - \$5.2M
Est. Cost to Upgrade	TBD

- Re-assess seismic performance as a secondary priority



Georgia & Dunsmuir Viaducts

AADT	40,000 (combined)
Seismic Risk Priority	Higher
Past Seismic Upgrades	none
Est. Cost to Upgrade	\$100M+ (Economically Unviable)

- Recommend removal



Granville Bridge

AADT	56,800
Seismic Risk Priority	Higher
Past Seismic Upgrades	1990s - \$7.5M 2013 - \$1.5M
Est. Cost to Upgrade	\$5M – Steel spans TBD – On and Off Ramps

- Shelf ready design for steel spans
- North approaches to be assessed in 2018



Cambie Bridge

AADT	54,900
Seismic Risk Priority	Higher
Past Seismic Upgrades	2009 - \$500k
Est. Cost to Upgrade	\$1.5M – Design \$30M - Upgrade

- Recommend completion of design in next plan



Grandview Viaduct

AADT	40,000
Seismic Risk Priority	Medium
Past Seismic Upgrades	1990s- \$300k 2010 - \$150k
Est. Cost to upgrade	TBD

- Re-assess seismic performance as a secondary priority





Key Accomplishments 2017	What We're Working On
<p>Next Generation Radio System for Fire and Police (E-Comm)</p> <ul style="list-style-type: none">• Increased resilience• Increased interoperability• Increased building penetration <p>Pilot of Emergency Notification System for staff</p>	<p>Emergency Management Information System</p> <ul style="list-style-type: none">• Procurement complete• Working on configuration, training, and roll-out by Q2 2018 <p>Engineering Radio System</p> <ul style="list-style-type: none">• Re-assess network resilience and functionality



Key Accomplishments 2017	What We're Working On
<p>Emergency Management training</p> <ul style="list-style-type: none">• 2,157 person-hours of training delivered (as of Q3)<ul style="list-style-type: none">• EOC, Disaster Staging Areas, Emergency Social Services <p>Development of new advanced Emergency Operations Centre courses</p> <ul style="list-style-type: none">• Logistics• Finance <p>Exercise Sweeper</p> <ul style="list-style-type: none">• Regional emergency communication exercise	<p>2019 earthquake exercise planning</p> <ul style="list-style-type: none">• Working with departments to finalize objectives and construct exercise• Continued outreach and integration with regional / provincial stakeholders to align planning & exercise initiatives related to:<ul style="list-style-type: none">• damage assessment• mass care• disaster debris management



Wildfire deployments

Volunteers and staff deployed to support Freshet and Wildfire response throughout the province.

Benefits

- Provide support to local, regional, and provincial partners in need
- Gain valuable experience
- Building critical relationships between staff and between organizations



Wildfire deployments

- **Volunteer Deployments**

9 Vancouver Volunteer Corps volunteers deployed to support evacuees and provide emergency communication support (Chilliwack, Prince George, Kamloops)

- **Emergency Management and VanTEAMS Staff Deployments**

9 City staff supported First Nations, and local, regional, and provincial government emergency operations centres and Emergency Social Services operations (Williams Lake, Prince George, Kamloops, Kelowna, Vernon, Victoria)

- Staff sent were from Emergency Management and our EOC staff reserve pool (VanTEAMS)





Wildfire deployments

- **CAN-TF1**
22 members provided support to Provincial Regional Emergency Operations Centres in Prince George and Kamloops
- **VFRS**
54 VFRS staff deployed to assist with wildfire response at Williams Lake and the Elephant Hill fires.



Texas deployment

- **CAN-TF1 observers sent to Texas**
Small team sent to observe Texas Taskforce 1 during response to hurricane flooding



Alignment of OEM and VFRS under one General Manager

- Vancouver Fire and Rescue Services and the Office of Emergency Management aligned under Darrell Reid, Fire Chief and GM of VFRS and Emergency Management, this summer.
- Chief Reid brings a varied background to these portfolios, with experience in both Fire and Emergency Management, as well as not-for-profit management
- Ability to leverage synergies and capacity between VFRS and Emergency Management

Buildings

Goal: To reduce the risk of earthquake building damage through the collaboration of scientists, engineers, building developers, building owners, and government.

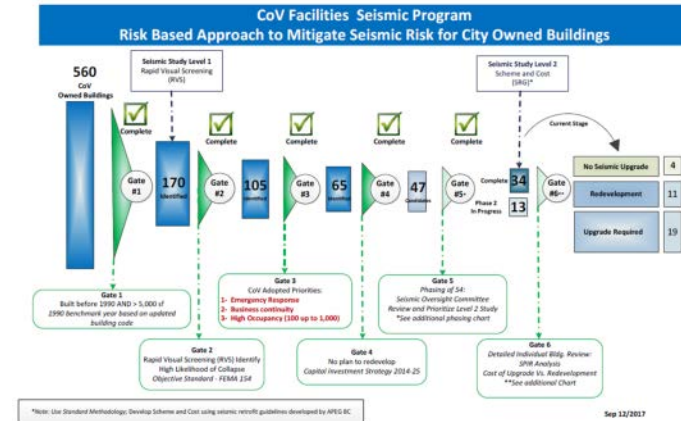


Key Accomplishments 2017	What We're Working On
<ul style="list-style-type: none">• Continued seismic assessments of civic buildings• Risk Mitigation Projects<ul style="list-style-type: none">• East Wing demolition• West Annex seismic upgrade & Earthquake Early Warning System pilot• Non-structural upgrades (e.g. VPD building skylights, interior renovations)	<ul style="list-style-type: none">• Evaluation of 47 seismic reports for 2019-2022 capital plan recommendations• Development of non-structural implementation plan in progress and identification of priorities for 2019-2022 capital plan



Status of Civic Building Seismic Reviews

- 560 City-owned and operated buildings reviewed
- 170 priority buildings underwent Rapid Visual Seismic Screening
- 47 buildings shortlisted for Level 2 studies (Seismic Retrofit Guidelines)
 - 34 completed
 - 4 – no seismic upgrade
 - 11 – redevelopment
 - 19 – upgrade required
 - 13 in progress (est. completion early 2018)





West Annex Seismic Upgrade Project

- Voluntary structural seismic upgrade completed in August 2017
- Meets 100% of current Vancouver Building By-law seismic requirements
- Earthquake early warning system & strong motion instrumentation installed as pilot
- Project budget: \$5.36 M





Key Accomplishments	What We're Working On
<ul style="list-style-type: none">• Hiring of Project Manager to lead 2 year initiative for development of mitigation program for private buildings• Establishment of regional seismic working group of senior local government and provincial representatives<ul style="list-style-type: none">• Province of BC• City of Vancouver• City of Victoria• District of North Vancouver	<ul style="list-style-type: none">• Formalizing technical working committee to inform local seismic mitigation project• Creating 100 Resilient Cities working group to collaborate on seismic risk reduction.



Seismic Mitigation Program for High-Risk Buildings

- Hired program lead with background in seismic risk mitigation programs
- 2-year initiative to develop a program and policy options to reduce risk of privately owned building stock
- Program and policy recommendations may include structural and non-structural options, including bylaw updates, financing and incentive programs, prioritization criteria, post-disaster use.

Near-term actions (Q4 2017)

- Convene technical working group
- Evaluate current data, status of risk, local and global programs and opportunities for Vancouver
- Refine work plan and stakeholder engagement strategy



Leveraging 100 Resilient Cities Network

- 32 member cities prioritizing seismic risk
- Significant learnings emerging from Mexico City
- Vancouver working with Resilience Officers across 12 cities to launch 100 RC Community of Practice and bring knowledge and solutions to Vancouver

 VANCOUVER

 EARTHQUAKE/SEISMIC

 OTHER 100RC CITIES



Summary



- Work continues in all areas of the Earthquake Preparedness Strategy
- Focus is on building **community resilience**, ensuring our **infrastructure and core services are resilient**, and exploring options to **mitigate the risk in both City-owned and private buildings**
- Volunteer teams continue to be critical components of the City's resilience and response capacity
- Volunteers and staff supported our partners and gained valuable experience supporting the freshet and wildfire response in BC
- We continue to leverage the 100 Resilient Cities network for support and expertise



Get Ready to ShakeOut.

Register Now at www.ShakeOutBC.ca

October 19, 2017

The Great
British Columbia
**Shake
Out**



Science World ShakeOut Event – Oct 19 (morning)

Seismic and Tsunami Science

- Shake Zone earthquake simulator
- Speakers
- Information booths