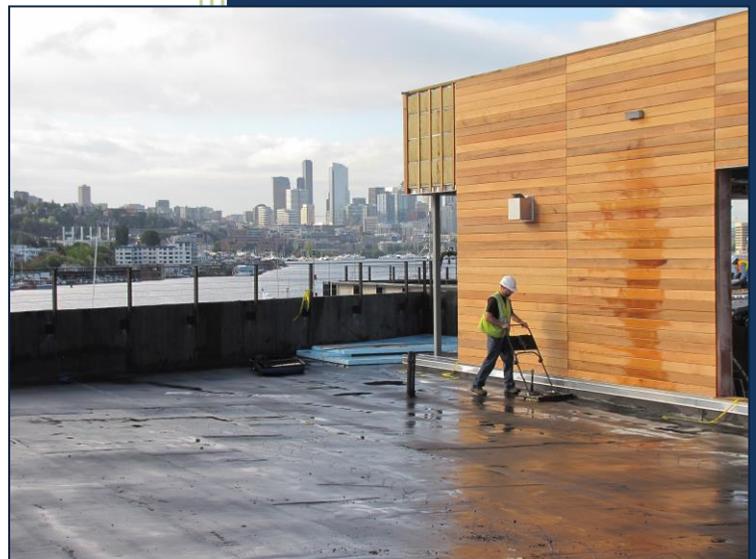


Statement of Qualifications



Detec Systems

Electronic Leak Detection
Moisture Intrusion Solutions

Toll Free:

855.75DETEC

855.753.3832

www.detecsystems.com

info@detecsystems.com

Australia Phone 0476 066 618

www.detecaustralia.com.au

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COMPANY SUMMARY

INTRODUCTION

Detec Systems, serving the building industry since 2003, develops and provides leading-edge technology in the field of Electronic Leak Detection (ELD) internationally. This technology includes automated building envelope monitoring, waterproof membrane integrity testing, as well as periodic and continuously monitored leak detection systems for commercial waterproof membrane assemblies. **Detec's** patented technologies assist in the quality control of waterproof membrane installations and in revealing water or moisture intrusion. Our monitoring systems will alert owners of the water intrusion and provide data regarding its severity and location. **Detec** provides unparalleled risk mitigation for property owners and their development teams. **Detec** is committed to its goal of improving the sustainability of buildings through advanced testing and monitoring of the roof and building envelope systems from construction through the service life of the building.

SERVICES

Detec has developed three categories of innovative services: Quality Control, Leak and Moisture Detection / Monitoring Systems, and Conductive Primers as follows:

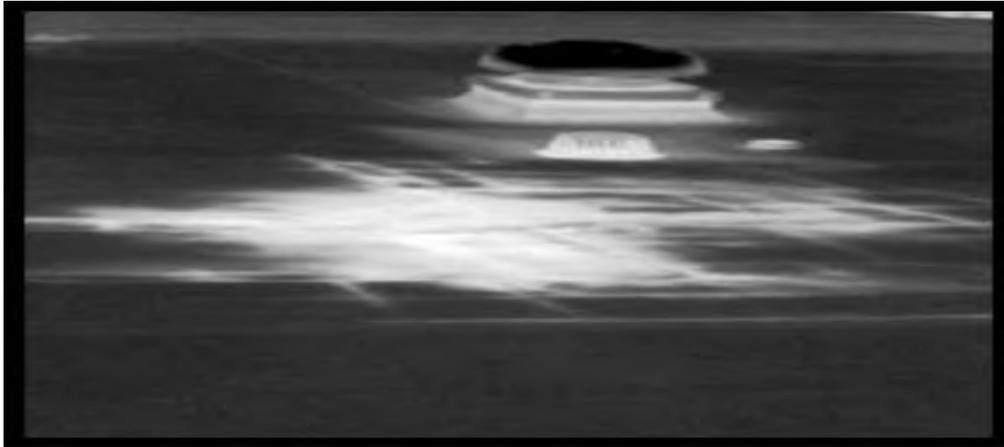
IntegriScan™ - A scanning service that provides third-party testing to confirm the integrity of the waterproof membrane installation. This quality control method is ideal for membranes adhered directly to concrete, metal, or any conductive deck (i.e. green roofs, plaza decks, below grade walls, etc.). An **IntegriScan™** replaces the uncertainty of the legacy flood test method which is often difficult to implement, time consuming, hazardous, and expensive. The **IntegriScan™** uses minimal water and time and provides absolute confirmation that a membrane is watertight. An **IntegriScan™** can be used on horizontal and vertical surfaces and can also locate hard to find leaks in older membranes.

PermaScan™ systems are designed and installed to monitor for water intrusion through the building enclosure's roof, walls, and/or below grade assemblies. High risk areas within the structure such as water features, commercial kitchens, and water containment installations may be monitored as well. When leaks have been identified and corrected, the **PermaScan™** systems provide important confirmation of the success of the correction. These systems report on the waterproof membrane assemblies' moisture performance for the life of the structure through either a periodic test method or continuously monitored option. With this critical information, owners can act proactively to correct moisture problems with appropriate means and methods thereby minimizing the damage and the need to rely on insurance claims and lawsuits for recovery.

TruGround™ Conductive Primer is a patented **Detec** product that when applied to a non-conductive surface enables scanning of conventional waterproof membrane assemblies for the life of the building. A conductive substrate is required on conventional assemblies for Electronic Leak Detection tests.

THE PROBLEMS

Every year, building owners, development teams, and their insurers spend hundreds of millions of dollars litigating and repairing water intrusion problems. The collateral damages include thousands of tons of wasted building materials, increases in insurance rates, non-renewal of policies, lost productivity, and injured reputations. The vast majority of these problems are the result of water intrusions that cause moisture to accumulate in the concealed spaces of buildings.



The failure to detect, identify, and correct minor water intrusions at the earliest stages is considered the greatest cause of premature roof failure. This is particularly true of roofing materials applied on low-slope or flat roofs. Costly roofing problems are often the result of design deficiencies, faulty installation, or damage from other trades after installation. Even when properly designed and installed, roofing materials deteriorate from exposure. Roof designs that incorporate a waterproofing membrane under a green roof or other overburden greatly exacerbate the problem of locating leaks.

Unchecked moisture accumulation will reduce the structural soundness of buildings by creating rot in wood and corrosion in steel. Moisture can affect the health of occupants directly by breeding harmful organisms such as mold spores. Moisture can reduce the service life of the building structure and sensitive electronics through premature degradation of components. In short, uncontrolled moisture will negate the most vital and important qualities of a building. As stated in ASTM Standard E241, Practices for Increasing Durability of Building Constructions Against Water-Induced Damage; **“Except for structural errors, about 90 percent of all building construction problems are associated with water in some way.”**

While green roofs appear to be an improvement over tar and gravel roofs, the warranty providers have serious concerns. When leaks occur, huge costs can be incurred in removing expensive green roof components, locating the leaks, and repairing the associated damages. These damages can mount rapidly while the contractor searches for leaks that probably originated months prior to the discovery of the damage. The leaks often allow water to accumulate between the membrane and the deck over time until it finds a joint, crack, or penetration to follow downward. The misconception that the leaks “just occurred today” is typical and costly.

SOLUTIONS BY DETEC SYSTEMS

IntegriScan™ – Membrane Integrity Scan

- Confirms conclusively if a horizontal or vertical membrane is water tight
- Locates breaches during installation so repairs can be made immediately
- Locates breaches caused by trade damage prior to the placing of overburden
- Provides a safe, precise, cost effective, and conclusive substitute for flood testing
- Pinpoints hard to find leaks in older membranes
- Delivers quality control through third party verification
- Preferred by warranty providers, contractors, and consultants

Membrane Integrity Testing (RMIS Platform Scanner)

The principle of this Electronic Leak Detection (ELD) method is to establish a voltage potential between the membrane and the roof deck and then track any leakage current. This is accomplished by wetting the surface of the membrane, applying a voltage with respect to ground and then locating areas where electrical current flows through membrane breaches to the deck.

A scanning platform is used to test the membrane for breaches. The platform is constructed with two sets of metal sweeps which make continuous electrical contact with the membrane surface. The outer sweep forms a continuous perimeter around the platform with the inner sweep contained within the perimeter of the outer sweep.

The positive terminal of the unit is attached to the building electrical ground or the roof deck (concrete, metal, or any conductive material) and the negative terminals on the unit are attached to the sweeper sensors of the unit via the inner and outer sweep meters. Since roof membranes are non-conductive (excluding metal and high carbon black loaded materials such as EPDM) the electrical signal from the outer sweep loop provides an electrical path over the wet area of the roof to any breach within the wetted area, thus completing the circuit to the ground wire.

During the membrane scan, a light spray of water is applied to the deck in front of the advancing platform. The outer sweep responds to and displays any leakage current in the test area. The inner sweep will detect a maximum leakage current when the sweep platform is directly over the membrane defect. This will result in a maximum indication on the inner sweep meter accompanied by an audible alert. This precisely identifies the place where water is penetrating through a breach in the membrane.



Vertical Surface Leak Locate (VSLL)

The vertical surface leak locating system picks up where horizontal scanning methods leave off. As seen in the photo below, the VSLL employs a sensitive current, sensing receiver and a roller or sponge-like water moistened sensor.



The moistened sensor is pressed against the surface area being tested. This action forces water onto the membrane surface and into any unsealed seam. At a breach location, a leakage current will flow from the ground connection to the breach location and returns to the receiver through the moisture sensor. The receiver will register a deflection on the signal level meter accompanied by an audible alert.

The Vertical Surface Leak Locator is used to test the membrane integrity of corners, parapet walls, seams, etc. prior to carrying out membrane testing in the field of the roof with the scanning platform.

PermaScan™ – Embedded Leak and Moisture Detection Monitoring Systems

The PermaScan™ – I System is a permanent moisture detection grid system placed **on top of a waterproof membrane** (for inverted roof assemblies) in order to detect and localize leaks within an area defined by the grid spacing. The membrane is first tested using our IntegriScan RMIS to confirm the integrity of the membrane and then a two-conductor moisture detection tape is adhered to the top of the membrane. A measuring voltage is applied between the detection conductors and the underlying deck. Any water path between the detection conductors and a breach will result in a leakage current from the deck to the detection conductors through the electrically insulating membrane.

The PermaScan grid system is illustrated in the photo. Each detection tape strip is measured in sequence for any leakage current through a breach in the membrane to the deck below. The leakage current level is then mapped out on the as-built grid plan thereby identifying and localizing any leaking section of the membrane. By performing a routine leak detection and locate procedure either automatically or from an access panel, membrane breaches can be quickly identified and located without the need for direct roof access.



Once a leak has been localized to a gridded area, the conductors can be used to apply a locating signal for the Electric Gradient Leak Locate system (EGLL) to further pin-point any breach location within a grid size area. The leak locate grid system provides an accurate method to monitor and maintain a wide range of covered roof types and sizes and is particularly effective on inverted roofs where the membrane is not easily accessible.

The PermaScan™ - C System is a leak detection method used on conventional roof assemblies whereby a leak locating grid is placed underneath the membrane to detect and localize leaks within an area defined by the grid spacing. A two-conductor moisture detection tape (MDT) is adhered on top of the vapor retarder or other suitable layer underneath the membrane. A measuring voltage is applied between the detection conductors on a selected grid tape. Any water path between the detection conductors will result in a leakage current across the detection conductor pair.

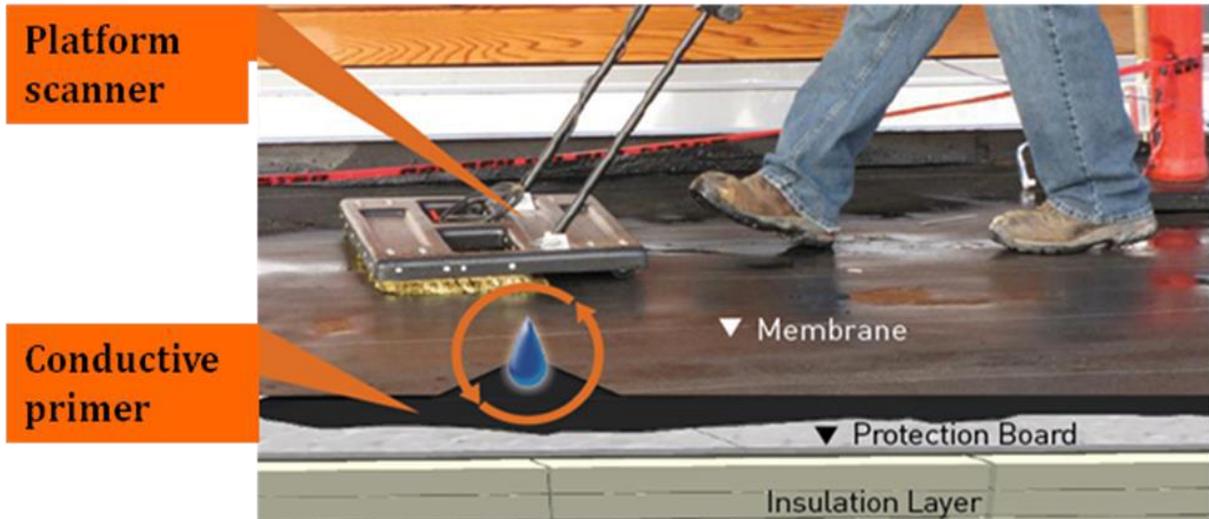
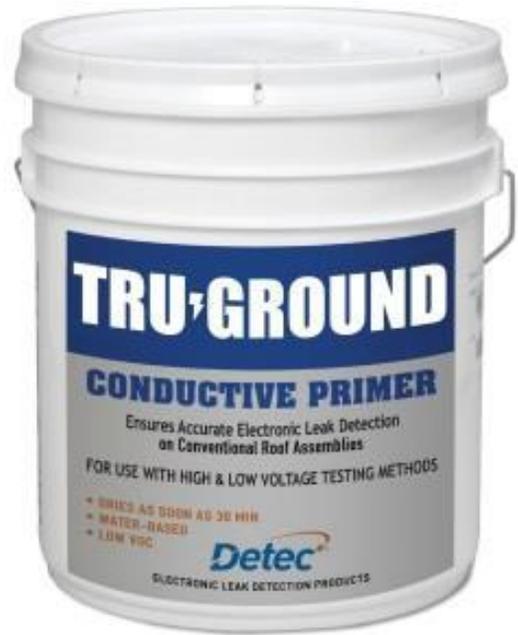
A moisture path across the conductor pair results in a fault current that is detected by the measuring circuit. Each detection tape strip is measured in sequence for any leakage current.



The leakage current level is then mapped out on the as-built grid plan thereby identifying and localizing any leaking sections underneath the membrane. By performing an automated routine leak detection and locate procedure, membrane leaks can be identified and located to an area within a grid section.

TruGround™ Conductive Primer

Detec's TruGround™ conductive primer is a water-soluble coating that allows for effective and conclusive low voltage membrane integrity testing when applied to the surface immediately beneath the waterproof membranes on conventional assemblies. TruGround is chemically and mechanically compatible with fully-adhered, mechanically attached, and torch-down membrane systems. Once applied, the roof membrane can be integrity tested for the life of the assembly, making it easy to find any future leaks.



Monitoring options

Understanding the actual moisture performance of the building enclosure is the key to controlling the risk of major moisture intrusion damages. **Detec's** monitoring system includes the process of collecting data generated by the PermaScan™ systems, analyzing it, and then producing meaningful reports to facilitate this understanding for the building owner. In the case of roof leaks, early notice can mean the difference between a routine maintenance project and a costly construction defect claim.

Detec Systems permanently installed PermaScan™ systems provide the ability to continuously monitor or test the critical areas of the building envelope or waterproof membrane. The measurement technology and data management process provide design professionals and facilities managers with critical information needed to optimize building performance while minimizing life cycle costs.

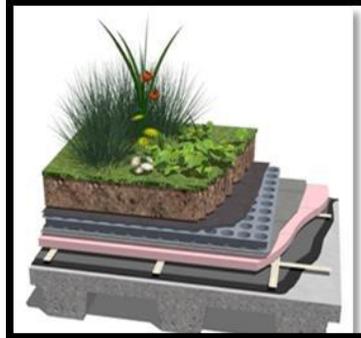
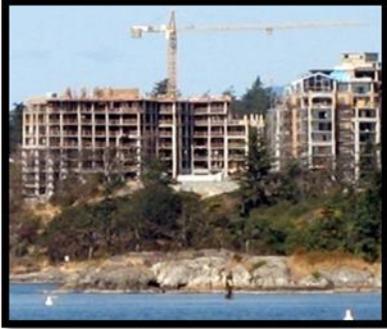
Continuous monitoring or testing identifies problems long before damages become apparent. This trend analysis lies at the core of understanding the moisture performance of a building enclosure. Once a responsible party understands the hidden areas of the building and is armed with specific water intrusion information, building management can respond appropriately and execute a plan to correct potential problems early before they spiral out of control. These proactive measures contribute to the durability of sustainable building. After all, sustainability without durability is a hollow promise.

Detec Systems extends this higher standard of care over the life of the membrane by providing monitoring during construction and either periodic testing or fully automated monitoring of the PermaScan™- I and PermaScan™- C systems after commissioning. These low-voltage, computer controlled systems detect leaks or moisture intrusion when they occur instead of when they eventually appear in the occupied spaces below. The systems can monitor virtually any area within the building where hidden water leaks or moisture intrusion could be problematic. This essential and timely notice, combined with a pinpoint leak locating capability, delivers state-of-the-art risk mitigation against concealed moisture accumulations. Typically, **Detec's** automated monitoring systems can be programmed to interface with an existing building management system.

Detec's monitoring options include:

- During construction, the roof assembly is monitored for breaches and trade damage. Any moisture intrusion will be detected immediately.
- Fully automated by **Detec**, which offers 24/7 continuous monitoring along with a monthly report to the client for the PermaScan™ systems.
- Self-monitored by client using **Detec's** cloud service allows the client to have access to our cloud based monitoring site for self-monitoring.

PERMASCAN USES AND APPLICATIONS



Any new membrane, where water intrusion, moisture accumulation, or internal flooding is a concern, is a candidate for a **Detec** solution. The technologies are ideally suited for plaza deck construction, green roofs, remediation projects, renovations, restorations, and roof membrane replacements. Since the moisture sensing components are installed within the roof assembly or envelope cavities, full utilization of the technology may be limited for use in existing buildings, though they can be used forensically if the membrane is exposed.

Projects ideal for Electronic Leak Detection Systems include:

- | | |
|--|---------------------------------|
| Multi-family Buildings | Education Facilities |
| Mixed Use Buildings | Document Storage Facilities |
| Institutional and Government Buildings | Reservoir Covers |
| Data Processing Centers | Commercial and Office Buildings |
| Hospitals and Medical Facilities | Mission Critical Buildings |
| Cold Storage Facilities | High End Pre-Manufactured Homes |
| Tunnels | Parking Garages |

Features ideal for Electronic Leak Detection Systems include:

- | | |
|----------------------------|------------------------------------|
| Green Roofs | Low Slope Roofs |
| Plaza Decks | Stud Wall Cavities (Metal or Wood) |
| LEED Projects | Commercial Kitchens |
| Roof and Deck Penetrations | Water Features |
| Reservoir Lids | |

COMPLETED PROJECTS



Medical Facilities

Mayo Clinic NMR Project, Minneapolis, MN
Palomar Medical Center, San Diego, CA
Virginia Mason Medical Center, Seattle, WA
Peter Lougheed Health Center, Calgary, AB
Mirabella Seattle Assisted Living Facility, Seattle, WA
Tacoma General Hospital, Tacoma, WA
PG Regional Hospital, Prince George, BC
Royal Inland Hospital, Kamloops, BC
Massachusetts General Hospital, Boston, MA
Virginia Treatment Center for Children, Richmond, VA

WA Health Labs, Shoreline, WA
Mirabella (Retirement Living Tower), Portland, OR
Baystate Medical Center, Springfield, MA
Edmonton Clinic North, Edmonton, AB
Royal Jubilee Hospital, Victoria, BC
BC Cancer Agency, Prince George, BC
Swedish Assisted Living, Vancouver, BC
Providence St. Vincent Medical Center, Portland, OR
Seattle Children's Hospital, Seattle, WA
Winnipeg Woman's Hospital, Winnipeg, MB



Multi-Unit Dwellings

Bellagio Condominiums, Seattle, WA
The Oscar, Vancouver, BC
78 Unit Condominium, Tacoma, WA
Parc Residence, Victoria, BC
Moda Condominiums (251 Units), Seattle, WA
365 Waterfront Project, Victoria, BC
Rollin Street Flats, Seattle, WA
Carey Centre, Vancouver, BC
The Reverie at Marcato, Tacoma, WA
O2 Condominiums, Vancouver, BC
2200 Westlake Condominiums, Seattle, WA
Pearl on Hillside Condominiums, Victoria, BC
Swallows Landing Condominiums, Victoria, BC
The Opal Condominiums, Richmond, BC
Parkside Resort, Victoria, BC
Mariners Village, Victoria, BC
Shoal Point, Victoria, BC
South Van Housing Society, Vancouver, BC
West Royal Townhomes, Vancouver, BC
Laurel Village, Bellingham, WA
1420 Pearl Apartments, Portland, OR
One Pacific Tower, Seattle, WA

Gregory Condominiums Portland, OR
Crossroads, Vancouver, BC
9595 Erickson, Burnaby, BC
Richmond Property Group Parkade, Victoria, BC
Harriet Gardens Condominiums, Victoria, BC
Dockside Green Courtyard, Victoria, BC
1818 Madison, Seattle, WA
Hillside Terrace Seniors Centre, Victoria, BC
The Atrium, Victoria BC
The Hudson, Victoria, BC
Park Place, Seattle WA
Maravilla Retirement Community, Scottsdale, AZ
Mirabella Retirement Community, Portland, OR
Aljoya Retirement Community, Mercer Island, WA
2151 Burnside Road West, Victoria, BC
Swallows Landing, Victoria, BC
1090 West Georgia, Vancouver, BC
999 West Hastings St, Vancouver, BC
Seawest Quay, Victoria, BC
Alouette Heights, Alouette, BC
Apple Tenant, Seattle, WA
University Retirement Community, Davis, CA



Educational Facilities

Southern Alberta Institute of Technology, Calgary, AB
National Research Council, Ottawa, ON
Univ. of British Columbia-Buchanan, Vancouver, BC
WESTCON Research Project, Berkeley, CA
British Columbia Institute of Technology, Burnaby, BC
Ohlone Student Services Center, San Francisco, CA
Portland State University, Portland, OR
CCIS University of Edmonton, Edmonton, AB
Roofing Contractors Association of BC, Langley, BC
Stanford Hall School, Vancouver, BC
Simon Fraser University TASC 2, Burnaby, BC
"The Nest", University of British Columbia, BC
College of Marin, San Francisco CA
Missionary Training Center, Provo, UT

Nisga'a Museum, Nass River Valley, BC
Carleton College Severance Hall, Northfield, MN
Thompson River University, Kamloops, BC
Univ. of British Columbia - Multiple, Vancouver, BC
King St Station, Seattle, WA
Univ. of Washington - Multiple Projects, Seattle, WA
Portland Community College, Portland, OR
Woodwards, Simon Fraser University, Burnaby, BC
University of Colorado, Aurora, CO
Orchard Commons, University of BC
Civil Rights & History Museum, Jackson, MI
Museum of Westward Expansion, St Louis, MO
Columbia Valley Community Facility, Invermere, BC



Commercial / Office

JP Morgan Chase Building, Manhattan, NY
Nintendo Office Building, Redmond, WA
Amazon – Multiple projects, Seattle, WA
Facebook, Seattle, WA
Old Yankee Stadium, New York, NY
Microsoft West Campus, Redmond, WA
River Rock Casino, Richmond, BC
Bill & Melinda Gates Foundation (Iris), Seattle, WA
Arbutus Club, Vancouver, BC
Cactus Club, Vancouver, BC
Bond Building, Bend, OR
Canadian Broadcasting Corporation, Vancouver, BC
City Creek Center, Salt Lake City, UT
Commercial Office No. 5 Road, Richmond, BC
Prospera Credit Union, Abbotsford, BC
Safeway, Aldergrove, BC
Canada Line – Granville Street Link, Vancouver, BC
Capitol Regional District Green Roofs, Victoria, BC
Hewlett Packard, San Diego, CA
Bow Valley Square, Calgary, AB
Georgia Hotel, Vancouver, BC
250 City Road Mixed Use, London England
Nordstrom Sherway Gardens, ON

Wrigley Field, Chicago, IL
Hastings Park Childcare, Vancouver, BC
IKEA, Richmond, BC
Fashion Valley Mall, San Diego, CA
Robson Square - Multiple Projects, Vancouver, BC
PSE, Bothell, WA
Aleutian Spray Fisheries, Seattle, WA
George Schmidt Centre, Vancouver, BC
PCL Building 5, Edmonton, AB
SALT, Vancouver, BC
505 Union Station, Seattle, WA
739 Broadway, Seattle, WA
Uptown Mall Walmart, Victoria, BC
Cargill Waycross Terrace Replacement, Wayzata, MN
Oakbrook Mall, Oakbrook, IL
7084 Kingsway, Burnaby, BC
Chrysler Building, NY
Nordstrom, Toronto, OR
Nordstrom, Vancouver, BC



Government & Municipality

City of Seattle Beacon Hill Reservoir, Seattle, WA
Lacey, WA US Navy, Washington State
City of Seattle Myrtle Reservoir, Seattle, WA
University Retirement Community, Davis, CA
City of Seattle West Seattle Reservoir, Seattle, WA
Washington State Dept of Ecology, Olympia, WA
VCC Olympic Cauldron, Vancouver, BC
Terry Fox Plaza, Vancouver, BC
Colorado Justice Center, Denver, CO
BC Hydro Port Alberni, Port Alberni, BC
BC Hydro Horne Payne, Burnaby, BC
Surrey Center City Library, Surrey, BC
Alouette Corrections Center, Alouette, BC
Billings Federal Courthouse, Billings, MO
Jackson Federal Building, Seattle, WA
Chicago Federal Plaza, Chicago, IL
Seattle Justice Center, Seattle, WA
Royal Alberta Museum, Edmonton, AB
99 Tunnel, Seattle, WA

Vernon Library, Vernon, BC
Fort McMurray Airport, Fort McMurray, AB
Christian Faith Center, South, Federal Way, WA
36th Street Bridge, Redmond, WA
New San Andreas Courthouse, Calaveras, CA
South County Justice Center, Porterville, CA
Van Dusen Gardens, Vancouver, BC
Myriad Botanical Gardens, Oklahoma City, OK
Mukilteo City Hall, Mukilteo, WA
Surrey Civic Centre, Surrey, BC
Vancouver Police Department, Vancouver, BC
UCLA Film Archive Center, Santa Clarita, CA
Fort Reno Water Reservoir, Washington, DC
Laurentian University, Sudbury, ON
Longueuil Data Centre, Montreal, QB
Immigrant Services Facility, Vancouver, BC

CONCLUSION

The **Detec** service guarantee extends from the design phase through installation, start up, maintenance, continuous monitoring, and interpretation of events for our clients. Our points of service include:

- Cooperation with project envelope consultants to design the most effective system
- Collaboration to demonstrate contribution to LEED certification
- Coordination and training of electrical contractors
- Continuation of monitoring for the service life of the buildings
- Notification of moisture intrusion issues
- Interpretation of the reported data
- System maintenance to insure proper operation
- Consultation to achieve property insurance discounts

Detec's guidelines are based on published building science, applicable ASTM and ASHRAE Standards, forensic research, and the best practices established by industry organizations. These referenced publications include:

1. ASTM Standards:

- E 241 Standard Guide for Limiting Water-Induced Damage to Buildings
- E 2128 Standard Guide for Evaluating Water Leakage of Building Walls
- E 2266 Design and Construction of Low Rise Frame Building Wall Systems to Resist Water Intrusion
- D 7877 Electronic Methods for Detecting and Locating Leaks in Waterproof Membranes

2. Additional References:

- Guideline on Durability in Buildings, CSA S478-95 Joseph Lstiburek & John Carmody. (1996)
- Moisture Control Handbook. New York: Wiley. (Oak Ridge National Laboratory D#9-002388, ORNL/Sub/89-SD350/1)
- Wood Truss Council of America. (2007). Facts Regarding Mold on Wood Structural Building Components. Madison, WI: Author.
- Jerrold E. Winandy & Jeffrey J. Morrell. (1993). Relationship Between Incipient Decay, Strength, and Chemical Composition of Douglas Fir Heartwood. Wood and Fiber Science, 25 (3), 278-288.