



**NEGATIVE (INTERIOR) SIDE  
BELOW-GRADE WATERPROOFING**

**Rectify groundwater intrusion issues as in  
accordance with NYCDOB Local Law 126**

# CONCRETE BRICK STONE RUBBLE

The CGI waterproofing system is a cost-effective and environmentally safe solution to stopping water infiltration in below-grade foundations, cellars, elevator pits, tunnels, mechanical rooms, vaulted structures, and garages.

CGI performs “concrete gel injection” by drilling and injecting a two-component hydrophilic resin system through the negative, or interior, side of the structure using our specialized equipment. The two liquid components, which are water-like in viscosity, penetrate the tiniest cracks, fissures and water pockets to the full depth of the substrate and travel to the compromised membrane above, chemically reacting to form a flexible gel barrier.

CGI's methodology is beneficial and advantageous as a result of the gel's properties, and, by implementing its technology from the negative side of the foundation, all costly and disruptive exterior excavations common with traditional waterproofing applications are avoided.

**CELLARS | ELEVATOR PITS | FLOOR SLABS ON GRADE  
MECHANICAL ROOMS | PARKING GARAGES | PIPE PENETRATION  
TUNNELS | VAULTED SIDEWALKS | VAULTED STRUCTURES**

# **The CGI Waterproofing System**

# A Two-Part Liquid Component System

## Component A

Hydrophilic Resin: Gelacryl by Grace-De Neef Co\*, Sika Inject 304 by Sika Co. or equal, combined with accelerator, results in precise tuning based on desired setting time. Setting time can be as quick as five seconds.

\* Grace has been bought by Certainteed but the trade name of DeNeef still exists.

+

## Component B

Water is combined with catalyst to enable gel reaction.

=

## Flexible Water Sealing Gel

demonstrates superior elasticity, adhesion and durability.

## Specialized Equipment

is utilized to inject at a working pressure exceeding 3,200 psi to combat hydrostatic groundwater pressure, superior elasticity, adhesion and durability.

## Properties

- Water-like viscosity
- Highly elastic and adhesive
- Lab tested as non-toxic, non-flammable and non-hazardous
- Little to no odor produced during and after reaction
- Will not promote growth of fungi, mold or bacteria
- Cleans with water requiring no cleaning solvent
- Resilient against water containing oil, salt and/or sewage

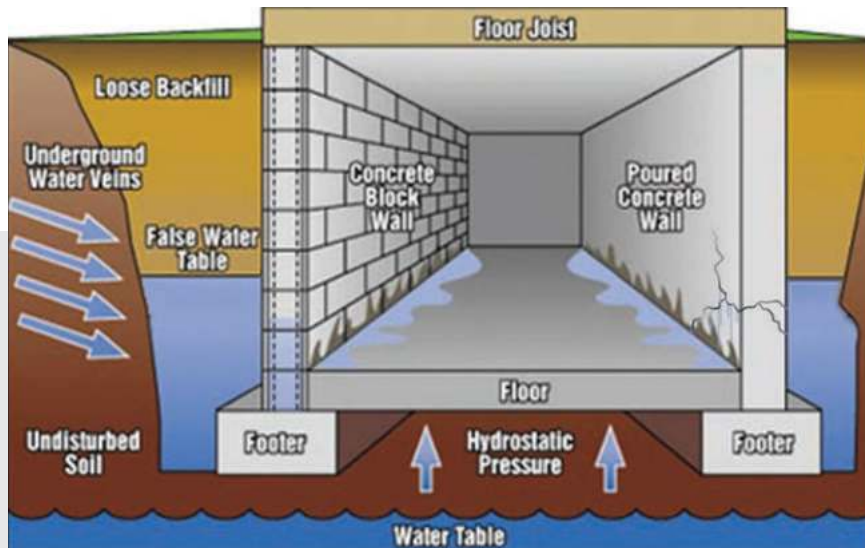
## Advantages

- Disruptive exterior excavations avoided
- Implement technology during active leaks
- No drilling to the positive side required, avoiding damage to existing waterproofing membrane(s)
- Controlled setting time calculated based on active water pressure and volume
- Occupies and seals water entry points for the life of the structure

## Benefits

- Reclaim unusable space
- Restore structural integrity, durability and appearance
- Reduce unhealthy and unsafe tenant conditions

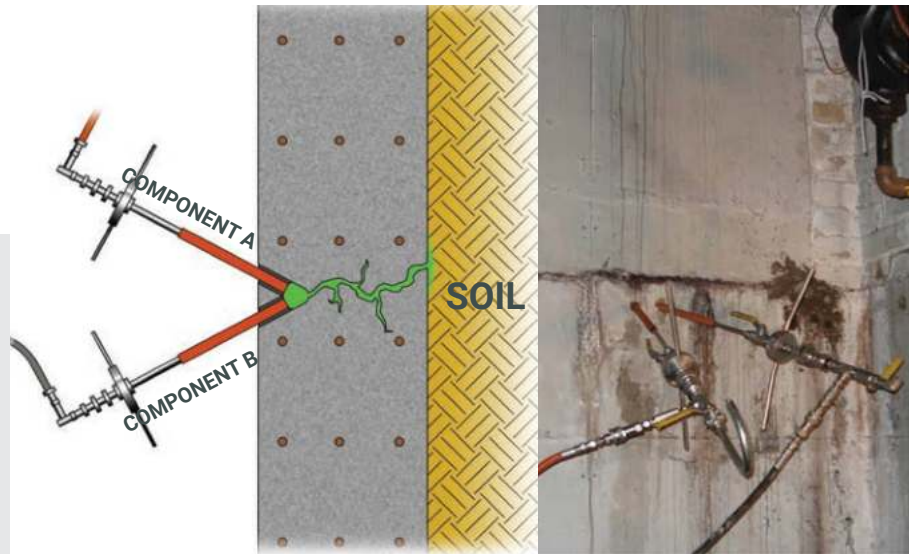
# Active Groundwater Infiltration Through Cracks and Cold Joints



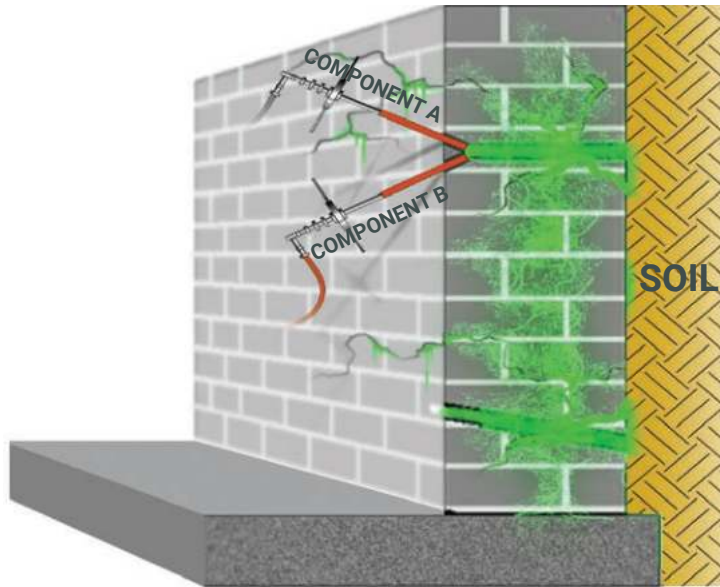
# Concrete Wall Injection

Holes are drilled from the interior side, next to cracks/cold joints, where the two liquid components are then pressure-injected within the substrate to form a flexible water sealing gel, which eliminates water intrusion.

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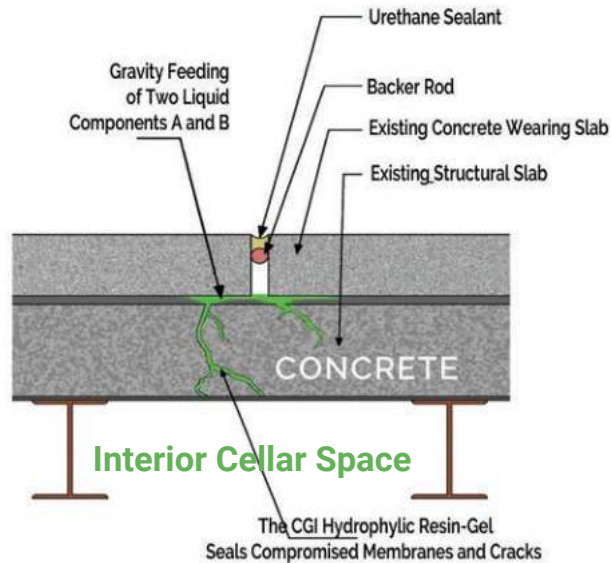


# Masonry Wall Injection



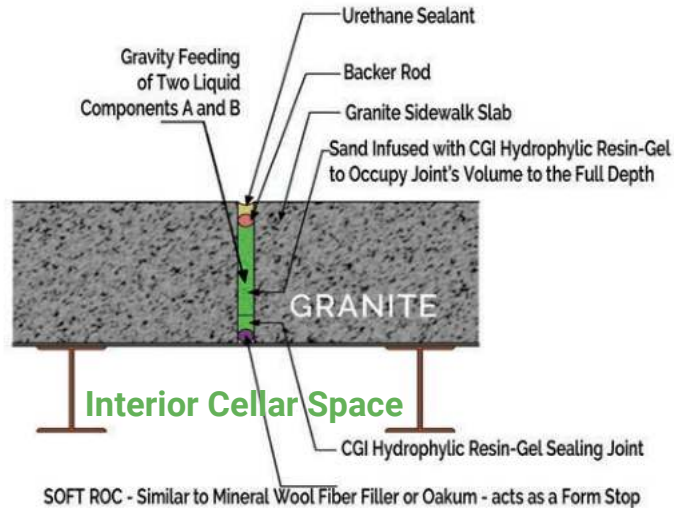
Holes are drilled from the interior side where the two liquid components are then pressure-injected within the substrate to form a flexible water sealing gel, which eliminates water intrusion.

# Vaulted Concrete Sidewalk Application





# Vaulted Granite Sidewalk Application



NEGATIVE (INTERIOR) SIDE WATERPROOFING TECHNOLOGY

## CGI Specialized Equipment



## Pipe Penetration Tools

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CORE TO PIPE PENETRATION



CONDUIT SLEEVE TO CABLE(S) PENETRATION (ANNULAR INJECTION)

## CGI Specialized Equipment



CONDUIT SLEEVE TO CABLE(S) PENETRATION (ANNULAR INJECTION)



# **Local Law 126**

**(Parking Garages)**



LOCAL LAW 126

New York City Department of Buildings (NYCDOB) LL126, Article 323, requires building owners to complete a series of steps to help improve the safety of parking garage structures in all five boroughs. A parking structure is defined as a building or space used for parking or storage of motor vehicles, other than an automotive service station, automotive repair shop, or private garages serving one and two family homes not exceeding 650 square feet in area and one story height.

The Periodic Inspection of Parking Structure (PIPS) requires the parking structure owner to be responsible for its proper inspection, repair and maintenance. The owner shall retain a New York State licensed professional engineer (PE) to examine the parking structure every



#### NEGATIVE (INTERIOR) SIDE WATERPROOFING TECHNOLOGY

six years and file a PIPS report. The PE must be certified as a Qualified Parking Structure Inspector (QPSI).

One of the main causes of structural integrity issues (i.e. corroding of steel reinforcement, concrete spalling, concrete degradation, etc.) is groundwater intrusion. The DOB is enforcing violations for the presence of groundwater in the Parking Garages.

CGI Northeast Inc. has the means and methods to rectify these groundwater intrusion issues safely and effectively in accordance with the Local Law 126





# **Case Studies**



Address:  
435 East 79th Street  
Parking Garage (NYC)  
Client:  
BLDG Management  
Technical Consultant:  
EDG Engineering

## CASE STUDY

### CONCRETE GEL INJECTION

**THIS** parking garage had below grade water entry points within the foundation walls (i.e. vertical cracks and cold joints), bottom of wall to floor slab interface, and floor slab on grade cracks. The bottom of the perimeter foundation walls to floor slab on grade was leaking excessively in the garage. This is the lowest elevation of the parking garage. This is very typical Manhattan and other high groundwater table locations. As



the concrete floor slab is situated on grade (on top of soil) at the lowest building elevation, the exterior footing to floor slab interface is a typical water intrusive culprit, which allows groundwater to penetrate and migrate through the interior bottom of wall to floor interface.

CGI pressure injection waterproofing was performed successfully within all the aforementioned below grade water entry points. Now the parking garage is completely dry and the groundwater free environment within the garage will alleviate any Local Law 126 issues in the future.

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### NEGATIVE (INTERIOR) SIDE WATERPROOFING TECHNOLOGY

Several vaulted cellar level office and storage rooms were experiencing below sidewalk rainwater intrusion from many years. As the top of the structural vaulted sidewalk slab had compromised waterproofing membrane, rainwater was entering through the deteriorated sidewalk wearing slab, and finding its way through the compromised waterproofing entering through concrete cracks; and then down through the ceiling plenums below. CGI NE utilized its CGI (Concrete Gel Injection) gravity feed two-component, hydrophilic resin waterproofing system through these vaulted sidewalk expansion joints. This program was implemented on all 3 sides of this building – the 6th Avenue side and the 46th and 47th Street sides..

The procedure was as follows:

The old caulking and residue material from the sidewalk expansion joints at the leaking locations were vacuumed clean, to allow for the proper CGI two liquid component resin penetration.

Then, the apply the Aqua Loc Resin LV at the determined gel setting time, within these expansion joints to penetrate the critical areas of membrane deterioration. This application in effect created a gel seal below the walking slab to prevent water from intruding into the cellar space below. Backer rod was then inserted within these joints and then the joints were caulked with new urethane sealant.

This program proved to be a huge success and the below sidewalk rainwater intrusion was remediated.

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Address:  
1185 Avenue of the  
Americas (NYC)  
Client:  
SL Green Realty Corp.  
Technical Consultant:  
CANY

CASE STUDY

**ONE** Wall Street is still ongoing as a residential conversion and retail addition in the NYC Financial District. The projected \$1.5 Billion undertaking is the largest office to condominium conversion in New York City history. In addition to the creation of 566 residential units, the project also will add a 44,000 SF Whole Foods Market and a Life Time fitness center in the lower levels of the building complex. This is where CGI Northeast had stepped in – to waterproof these 4 lower levels so that this space becomes usable for the retail establishments. During the heart of the pandemic, MRCE, the technical Consultant, had filed a letter with the NYCDOB to deem waterproofing the interior space of this building essential. This was needed for structural integrity and to avoid further mold development within the interior space of these lower subgrade levels. Consequently, the DOB approved this letter and allowed CGI NE to work within the lower levels. CGI was one of the only subcontractors under JT Magen that was allowed to work and had 2 crews working simultaneously at various building locations.



Besides successfully injecting into cracks and cold joints within the very thick, porous concrete foundation walls in these lower levels, the CGI Mechanics encountered trenches within the depth of the foundation walls at many locations. Upon seeing the active water emerging through cracks and joints, they would begin drilling only to encounter the voids within the trenches. These vertical trenches that ran in certain locations from the A level all the way down to the D level, were cut-out within the foundation walls many years ago to channel the water intrusion to the lowest level. In this fashion the water at the higher subgrade levels would not flood within the interior space. These trenches were no longer functioning as they had collected heavy sediment throughout the years and water was rolling out at the various levels. Consequently, the mechanics were directed to chop out these trenches back to solid substrate and perform CGI waterproofing within the further depth behind the trenches. This program of removing the trenches and then performing CGI waterproofing was successful and helped the chain of construction build out progressing, as the groundwater was remediated.

## CASE STUDY

CGI NORTHEAST INC.

### Address:

One Wall Street  
New York, NY

### Client and Developer:

Macklowe Properties

### Technical Consultant:

Mueser Rutledge

Consulting Engineers

### General Contractor:

J.T. Magen & Company

#### NEGATIVE (INTERIOR) SIDE WATERPROOFING TECHNOLOGY

**I**n the C4 Level Broadcast Tank Room, the south facing concrete foundation wall was showing signs of active below-grade water infiltration along with signs of previous water staining and efflorescence. Upon review, our team found vertical foundation wall cracks that started at the floor slab and continued upward on the wall, in addition to several locations with 3/4-inch diameter holes that were actively leaking. As a result of the structural defects, ponding of water was found on the floor slab on grade. The elevation of the cracks and holes were well within the groundwater table and under tremendous hydrostatic pressure as this C4 Level was at least 50 feet below-grade and very thick, as this structural wall was necessary to support the Freedom Tower above.

It was very critical that these actively leaking locations were rectified so that the specialized epoxy floor slab coating could be properly applied to a dry surface. These water entry points were successfully resolved using the CGI waterproofing system where our specialized pumps created the necessary pressure output of over 3,000 psi for the two-component gel to penetrate full depth toward the exterior side. Thus, the resulting gel was able to reach deep within the cracks and the holes for a complete waterproofing seal. Consequently, the general contractor was able to perform the application of the specialized epoxy coating effectively.

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**Address:**  
One World Trade Center  
285 Fulton Street  
New York, NY  
**Building Type:**  
Commercial  
**Location:**  
Oil Tank  
**Room Substrate:**  
Concrete  
**Owner:**  
The Durst Organization  
**General Contractor:**  
Tishman Construction

CASE STUDY

**11** Wall Street is one of the most prominent buildings in the NYC Financial District. Similarly as with the 1 Wall Street Building and many other older buildings in New York City, vertical trenches within the foundation walls were cut-out in the early days to divert the groundwater to the lowest subgrade floor of the building. Along the Wall Street concrete foundation wall, there exist caisson joints between two concrete pours. Originally this joint was created as a chase to allow the water to be collected in the B4 level. Over the years this system has failed and water was penetrating through the foundation walls and into the interior spaces of the B2, B3 and B4 levels. This water intrusion was seen in several of the caisson joints throughout the basement levels; specifically the caisson joint between concrete walls

#4 and #5 in the B2, B3, and B4 levels.

The existing embedded caisson timbers were removed and the resulting concrete voids were patched with high strength repair mortar. All debris from the bottom of the joints were removed to ensure proper drainage. Then CGI Waterproofing Injections were performed within the concrete substrate and the new concrete patching. The ground water was completely eliminated.



## NEGATIVE (INTERIOR) SIDE WATERPROOFING TECHNOLOGY

**THIS** skyscraper is the tallest residential tower in the Western Hemisphere. It has some of the most luxurious and expensive condominiums in the world. Usable retail space is extremely essential for a developer/owner in order to establish the necessary income and revenue needed to support the finances of the new construction market in Manhattan. At this property, there exist two (2) sidewalk vaults below the plaza and sidewalk on 56th Street that needed to be water tight so that retail income storage space could be created. The south facing structural vaulted walls consisted of porous concrete and masonry substrate. The concrete contractor during the new construction of the building had attempted to waterproof these walls from the interior-negative side by utilizing grout injection with ports. This procedure was attempted twice and had failed. CGI northeast was later called in and by removing the rusted ports and utilizing the deep penetrating low viscosity injection waterproofing components, these vaults were waterproofed successfully from the interior side.

There were other locations within the building that were implemented with CGI waterproofing means and methods. Hairline cracks within the foundation walls in the 3C Parking Garage were successfully implemented with the CGI procedure. Here too, chemical grout injection had failed, as the urethane consistency of the grout components could not penetrate deeply within these thick foundation walls of more than 2 feet in depth. The CGI water like viscosity liquid components were essential in this type of application as the space within the hairline cracks was very tight and the liquid components needed to result in a waterproofing gel within very deep concrete structures.

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**Address:**  
432 Park Avenue  
New York, NY  
**Client:**  
Macklowe Properties and  
CIM  
**Technical Consultant:**  
Mueser Rutledge  
Consulting Engineers

CASE STUDY



**1290** Avenue of the Americas is a 2.1 million sf office tower that has many high-end retail outlets at the ground level. This building occupied the majority of the blocks from 52nd Street to 51st Street and from 6th Avenue to 5th Avenue. The sub-cellar level Electrical Switch Gear Room is situated on the 51st Street side of the building, closest to 6th Avenue. The Con Ed vaults exist within the sidewalk level, below the steel gratings. It had been reported that during the early summer of 2019 during a very heavy rainstorm, the Con Ed vaults had filled with a large amount rainwater. The drainage or sump pump system within the electrical vaults had failed and water began pooling up within the vaults. The rainwater then found its way within the shared concrete foundation walls in the Electrical Room and was rolling down from the top of the south facing foundation walls. The water rolled on top of a 1 switch gear panel and caused an explosion. Luckily no one was hurt, but a couple of retail stores and several offices had lost power. As these tenants were paying rent at a high premium, a loss of power, even temporarily, could not be tolerated.

**Address:**

1290 Avenue of the  
Americas  
New York, NY

**Client:**

Vornado Realty Trust

**Technical Consultant:**

GMS Engineering

When the Vornado management team notified their technical consultant, GMS Engineering, to review and examine the water intrusion situation, GMS notified CGI NE to arrange to inspect the Electrical Switch Gear Room south facing foundation walls facing below the 51st Street sidewalk. The Con Ed network rooms were located in the C level directly above the SC level Switch Gear Room. These rooms were inspected, along with a Con Ed rep who had to give us access. There were certain crack and joint locations at the foundation walls at the C level of these network rooms. Some locations were accessible to drill/inject but other locations had live busses that were obviously too dangerous for our mechanics to address. However, it was determined that the majority of the water was entering through a horizontal cold joint that runs along this south foundation wall. As the C level structural concrete floor slab or the SC level concrete ceiling slab is 10 to 12 inches in thickness, this cold joint is located within the foundation wall where this floor slab / ceiling slab bisects the foundation wall. Consequently, the water was pooling in the exterior sidewalk Con Ed vaults, entering through this cold joint, and then the water was migrating downward into this SC Level Electric Switch Gear Room.

## CASE STUDY

### NEGATIVE (INTERIOR) SIDE WATERPROOFING TECHNOLOGY

This water intrusion situation was attacked in two phases. The first phase would involve performing the CGI waterproofing through the underside of the Con Ed Network Service Cellar level floor slab (concrete structural ceiling slab in SC level of the Switchgear Room). The injection holes would be drilled on an angle upward through the top of the wall interface, above the parallel 'I' beam, through the underside of the structural ceiling slab and into the foundation wall. The injection waterproofing was implemented through these holes successfully, as the resin-gel penetrated and sealed the embedded horizontal cold joint within this interface. The mechanics also drilled and injected successfully within the accessible and safe locations of the C level network room foundation walls. The CGI program was a complete success and the Electrical Switch Gear Panels were no longer vulnerable to water rolling down on to them for potential electrical shut down.



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THE vaulted cellar space below 5th Avenue and 55th Street had been leaking for many years. The below street grade water intrusion below 55th Street was very problematic and was constantly migrating through the very porous masonry vaulted rubble structural walls. These vaulted masonry walls were vaulted below the street curb. As the exterior below street grade side Con Ed vaults, DEP vaults, Verizon vaults, etc. were directly located against the exterior side of these rubble masonry walls, the rainwater would collect in these vaults and act as pools of water. As there was no exterior side waterproofing membrane at the exterior side of these rubble walls, the groundwater would easily migrate through the old and deteriorated mortar joints and into the interior vaulted cellar space.



Typically, as the rubble wall structures and brick wall structures have deteriorated mortar joints which have occurred over time with continuous contact to water saturation, at the interior side they needed to be cut and pointed with Type S structural repair mortar and were filled solidly. Any larger voids within the rubble would need to be patched with high strength mortar. This is re-patching and this mortar pointing is

### NEGATIVE (INTERIOR) SIDE WATERPROOFING TECHNOLOGY

essential in order to create the necessary working pressure that is required to maximize the resin-gel penetration within the masonry wall. In addition, by filling-in and patching accordingly, the resin-gel can be maintained within the depth of the masonry wall during the injection procedure.

This intense masonry prep work and CGI waterproofing implementation proved be very successful in correcting the below grade water infiltration. The Peninsula management was then able to move forward with utilizing these vaulted cellar spaces for storage, offices, etc.



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## CONCRETE GEL INJECTION

**THE** buildings located at 55 Water Street have many plaza and vaulted sidewalkssurrounding them. Several vaulted cellar level office and storage rooms were experiencing below plaza and sidewalk rainwater intrusion from many years. The top of the structural vaulted sidewalk slabs and the top of the vaulted horizontal plaza with pavers had most likely a compromised waterproofing membrane at many locations. As a result, rainwater was entering through these compromised membrane locations and finding its way through the concrete cracks of the underside of these horizontal structural salabs and then down through the ceiling plenums below.



With access from the underside within the suspended ceiling plenums, the CGI waterproofing system is implemented with the crack and joints entry points. The beauty of the CGI system is the water-like viscosity two components that travel within the cracks. The holes are drilled within the depth of the concrete and never to exceed the depth to pierce additional waterproofing membrane. With the depth of the bored

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Address:  
55 Water Street (NYC)  
Client:  
New Water Street Corp  
Technical Consultant:  
OJR and Associates

## CASE STUDY

CGI NORTHEAST INC.

### NEGATIVE (INTERIOR) SIDE WATERPROOFING TECHNOLOGY

holes, the resulting gel of the 2 components with not only occupy the volume of the cracks and joints full depth, but also create a gel band at the compromised waterproofing locations.

This methodology of drilling/injecting from the underside of the structural horizontal slabs and correcting rainwater intrusion is a tremendously cost-effective solution. The only other option would be to remove the pavers and overburden down to the top of the structural slab membrane or for vaulted sidewalks, remove the walkway-wearing slab down to the waterproofing membrane, and apply new waterproofing membrane. Then of course re-installing the over burden and pavers; and concrete walkway slab for vaulted sidewalks.



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CASE STUDY

# Concrete Floor Slab Cracks & Seams

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The Uniondale  
Public Library  
400 Uniondale Avenue  
Uniondale, NY



## CONCRETE GEL INJECTION



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## NEGATIVE (INTERIOR) SIDE WATERPROOFING TECHNOLOGY



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1 Northside Piers  
Brooklyn, NY

33

# Concrete Floor Slab Cracks

# Tunnel & Oil Tank Room

NY-Presbyterian Hospital  
The Helmsley  
Medical Tower  
1320 York Avenue  
New York, NY

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CONCRETE GEL INJECTION



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NEGATIVE (INTERIOR) SIDE WATERPROOFING TECHNOLOGY



AFTER



# Boiler Room

CONCRETE GEL INJECTION

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Public School 101  
The Verrazano School  
2360 Benson Avenue  
Brooklyn, NY



BEFORE

CGI NORTHEAST INC.

# Vaulted Structural Slab Below Courtyard

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London Terrace Gardens  
435 West 23rd Street  
New York, NY



CONCRETE GEL INJECTION



Cracks

CGI NORTHEAST INC.

NEGATIVE (INTERIOR) SIDE WATERPROOFING TECHNOLOGY



Parking Garage Below



Perimeter Expansion Joints

# Cellar | Storage and Locker Area

The GM Building  
The Fifth Avenue  
Apple Store  
767 Fifth Avenue  
New York, NY



## NEGATIVE (INTERIOR) SIDE WATERPROOFING TECHNOLOGY



CGINORTHEAST.COM



New York University  
246 Greene Street  
New York, NY

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## Vaulted Structure | Sidewalk



# Vaulted Masonry Structure Below Street Grade

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The Evelyn Hotel  
7 East 27th Street  
New York, NY



CONCRETE GEL INJECTION



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## NEGATIVE (INTERIOR) SIDE WATERPROOFING TECHNOLOGY



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111 Mercer Street  
New York, NY

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## Rubble Walls

# Vaulted Sidewalk | Expansion Joints Above Cellar Level Interior Space

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1185 Avenue of the  
Americas  
New York, NY



CONCRETE GEL INJECTION



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NEGATIVE (INTERIOR) SIDE WATERPROOFING TECHNOLOGY



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Silver Towers South  
620 West 42nd Street  
New York, NY

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## Elevator Pit

# Tunnel

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Lincoln Center  
70 Lincoln Center Plaza  
New York, NY





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