



PRODUCT SUBMITTAL DOCUMENT
INFORMATION

CIPP LATERAL RENEWAL
CONNECTION SYSTEM
T-LINER®, SHORTY™
AND/OR
VAC-A-TEE® CLEANOUT SYSTEM

Updated 9/1/15

Product Submittal Review

ITEM 1.

Manufacturer Company Name: LMK Technologies, LLC

Contact Individual(s) Rick Gage

Street Address: 1779 Chessie Lane

City, State, Zip Code: Ottawa, IL 61350

Telephone: 815.433.1275 ext105 Facsimile: 815.433.0107

Product Submittal: INSTALLATION PRACTICE FOR REHABILITATION OF A FULL-LENGTH SEWER SERVICE LATERAL USING A ONE-PIECE MAIN AND LATERAL CURED-IN-PLACE LINER ASSEMBLY INSTALLED BY MEANS OF AIR INVERSION

Only Licensed and Trained Installers by LMK are authorized to install the LMK T-Liner, Shorty and/or VAC-A-TEE systems.

ITEM 2.

INTENT:

This specification covers material requirements, installation practices, and test methods for the reconstruction of a sewer service lateral pipe and the main connection without excavation. The lateral pipe is remotely renovated from the main pipe to a specified distance ranging from 3-feet to 200-feet. The pipe renovation shall be accomplished by the inversion and inflation of a resin impregnated, single-piece lateral and main connection liner assembly. The liner assembly is pressed against the lined main pipe and lateral pipe by inflation of a bladder and held under pressure until the thermo-set resin has cured. When cured, the liner extends over a predetermined length of the service lateral and the full circumference of the main pipe at the connection and forms a continuous, single-piece, tight fitting, corrosion resistant and verifiable non-leaking Main/Lateral cured in-place pipe (CIPP) outfitted with gasket seals. The Materials and Installation practices shall, at a minimum, adhere to the requirements of ASTM F2561-11 "Standard Practice for Rehabilitation of a Sewer Service Lateral and its Connection to the Main Using a One-Piece Main and Lateral Cured-in Place Liner".

The T-Liner/Shorty Main-to-Lateral Connection System has been installed extensively throughout the United States, Canada, Mexico, Germany, Denmark and Singapore.

LMK Technologies, LLC is the owner of Trademarks: T-Liner®, LMK®, Shorty™ and VAC-A-TEE®.

Larry Kiest, Jr. President/Founder.

Inventor of more than 110 issued patents teaching methods and apparatuses for the Rehabilitation of Underground Pipes, Conduits and similar Structures. Mr. Kiest is a Licensed Plumber in the State of Illinois, Advisory Board Member of Trenchless Technology Center Louisiana Tech University, Member of ASCE/ PINS Lateral Committee, served 2-terms Board Member of NASSCO (2008-2012), Original chairman that initiated the NASSCO Lateral Committee, Active Board Member NASTT (2012-current), Member of No-Dig Planning Committee, Member of AWWA Standards Committee, Member of WEF, Member WEF Collections Committee, V.P. and active board member 2010-current) of MSTT, Member of ASTM, and Chairman of Task Committee F17, subcommittee 17.67 standard practice for rehabilitation of a sewer service lateral using a one piece main and lateral cured-in-place liner installed by means of air inversion. Mr. Kiest has conducted business in the field of Trenchless Pipe Renewal Systems since 1985.

ITEM 3.**References:**

- 1) Jim Shelton PE, Arcadias Engineering, Wilmington, Delaware
Title: Senior Engineer
Phone: 302-658-1718 Fax 302-884-6909 E-mail: jshelton@pirnie.com
- 2) Hank Woodward, Town of Leesburg, Virginia
Title: City Engineer
Phone: 703-737-7074 E-mail: hwoodward@leesburgva.gov
- 3) John Vose, City of Naperville, Illinois
Title: Repairs and Excavation Supervisor
Phone: 630-420-6741 Fax: 630-420-4119 E-mail: vosej@naperville.il.us
- 4) Irene Mc Sweeney Woodfall, P.E., Boston Water and Sewer Commission, Boston, MA
Title: Director of Construction, 2003 Trenchless Technology Person of the Year Award.
Phone: 617-989-7000 E-mail: mcseene@bwsc.org
- 5) Scott Weaver, City of Portland, Oregon
Title: Maintenance Supervisor
Phone: 503-823-1744 Fax: 503-823-4043 E-mail: scott.weaver@pdxtrans.org
- 6) Brad MacDonald, City of Fort Saskatchewan, Alberta, Canada
Title: P&E Services, Engineering Technologist
Phone: 780-992-6259 Fax: 780-992-1375 E-mail: bmacdonal@fortsask.ca
- 7) David Archacki, City of Wilton Manors, Florida
Title: Director of Public Services
Phone: 954-818-7315 E-mail: darchacki@wiltonmanors.com
- 8) Randy Daniel, PE. City of Bay Harbor Islands, FL
Title: Staff Engineer
Phone: 305-866-6241 Fax: 305-866-4863 E-mail:
- 9) Ethan Heijan, Hazen Sawyer Engineers, Hollywood, FL
Title: Principal Engineer
Phone: 954-987-0066 Fax: 954-987-2949 E-mail: ehijn@hazenandsawyer.com
- 10) Chris Schuler, Miller Pipeline Corp., Indianapolis, IN
Title: General Manager of Municipal Services Division
Phone: 317-293-0278 Fax: 317-293-8502 E-mail: chris.schuler@millerpipeline.com
- 11) Jim Pierce, City of Jacksonville, NC
Title: PW Construction Inspector
Phone 910-358-3665 Fax 910-938-5278 E-mail: jpierce@ci.jacksonville.nc.us
- 12) Todd Williams PE, Arcadias Engineering, Newport News, VA
Title: Senior Project Manager
Phone: 302-884-6905 Fax: 757-837-8723 E-mail: twilliams@pirnie.com
- 13) Kamran Sarrami, PE, City of Toronto, ON, Canada
Title: Senior Engineer, District Contract Services, Toronto Water
Phone: 416/395-6370 Fax: 416/395-6305 E-mail: ksarrami@toronto.ca

ITEM 4.

<p>4.0 The Technique</p>	<p>The T-Liner/Shorty repair structurally renews the entire main/lateral fitting and extends up into the lateral pipe. The repair consist of a one-piece, continuous main and lateral lining that is vacuum impregnated with thermo-set resins, air inverted from the main up into the lateral by the action of a translucent bladder assembly; hereby referred to as a "Liner/Bladder Assembly".</p> <p>See LMK's T-Liner or Shorty Installation Specification Sheet</p>
<p>4.1 A brief description of the operation and technique; including materials and methods of installation.</p>	<p>The reconstruction will be accomplished using a non-woven fabric tube of particular length and a thermo-set resin with physical and chemical properties appropriate for the application. The lateral tube within a translucent inversion bladder is vacuum impregnated with the resin and then placed inside a protective launching device. The main liner sheet is formed as a tube by wrapping around the main bladder. The launching device is winched into the existing sewer. When the launching device is properly positioned and aligned with the lateral connection, the main liner is inflated and the resin-saturated tube is inverted up through the old lateral pipe by the action of an inversion bladder. The resin saturated tube is cured and the inversion bladder and launching device are removed. The end result is a one-piece structural lateral lining and main pipe fitting that provides a verifiable non-leaking connection with all mainline pipe types by incorporating two hydrophilic O-rings at each side of the mainline connection or a compression connection gasket in lieu of the O-rings on the mainline and an O-ring at the upper terminal end of the lateral.</p> <p>The lateral tube length will be:</p> <p style="padding-left: 40px;">T-Liner – 3 ft. to 200 ft. Shorty – 3 ft. or less</p> <p>The cured finished materials as described above will, upon installation inside the host pipe, exceed the minimum test standards specified by the American Society for Testing Methods F1216-07 and F2561-11.</p> <p><u>Minimum Test Standards for CIPP ASTM F1216 Appendix X1</u></p> <p style="padding-left: 40px;">FLEXURAL STRENGTH -ASTM D-790 4,500 PSI FLEXURAL MODULUS -ASTM D-790 250,000 PSI</p>
<p>4.2 Intended use: Structural Repair Crack/Joint Sealing of Root Intrusion and Water Infiltration</p>	<p>The system is designed for fully deteriorated pipe conditions. Typical installations are a direct result of ground water infiltration, root intrusion and structural defects such as open joints, offset joints, broken or missing pipe sections and hammer taps. The new pipe exhibits a smoothbore interior that typically increases flow rates.</p>

4.3 EXISTING SEWER (Main and Lateral)	<p>The system is compatible with most all types of pipes; V.C.P., Concrete, Cast Iron, P.V.C and existing main pipes that have been renewed by a CIPP process. Typically, full-length lining systems utilize an inner coating or film. Films may range from PVC, PU to PE. The system is compatible with all pipe materials due to the use of hydrophilic sealing O-rings embedded between the main pipe and lining at each terminal end of the Main/Lateral lining, or the use of the connection compression gasket in lieu of the O-rings on the mainline with an O-ring at the terminal end of the lateral tube. The mainline portion is cylindrically shaped producing a structural Main/Lateral fitting.</p>
4.4 Diameter Ranges	<p>Lateral: 3 – 8 inch diameters. Main: 6-inch through 36-inch.</p>
4.5 Transitioning Diameters	<p>The liner can transition from one pipe size to another ensuring adequate liner thickness throughout the lining.</p>
4.6 Circular and/or Non-Circular Capability	<p>The system can accommodate pipe ovality up to -20%.</p>
4.7 Maximum Length Between Access Points	<p>Typical MH-MH lengths are 500 feet. Extensions can be added.</p>
4.8 Material Limitations	<p>This system is designed for gravity sewers and low pressure piping.</p>
4.9 Lining Material Composition and Construction	<p>Needle punched felt or proprietary kitted tubes coated with a chemically resistant impervious film. The tube is stitched using Nomex®, high-temp, high-strength thread. The tube is air-tight and flexible in design to reduce inversion pressures.</p> <p>Minimum finished wall thickness: 4.0mm for 4 inch diameter pipe 4.5mm for 5 inch diameter pipe 4.5mm for 6 inch diameter pipe</p>
4.10 Main/Lateral Jointing System	<p>The lining material is constructed as a one-piece cylindrically shaped Main/Lateral fitting. The main and lateral lining tubes are stitched with high-temp Nomex® thread and thermally sealed. Therefore, there is no joining of two separate liners during the installation process. The end product is a one-piece structural Main/Lateral cured-in place pipe.</p>
4.11 Resin System	<p>Resin Systems include: LMK656 Non Filled ISO Polyester Resin. LMK656EN Filled ISO Polyester Resin. LMK700 Series Steam Cured Epoxy Resin. LMK770 Series Ambient Cured Epoxy Resin. LMK100 Series VOC Free Vinyl Ester Resin.. 4-inch tube requires .92lbs of resin per lineal foot. 5-inch tube requires 1.40lbs of resin per lineal foot. 6-inch tube requires 1.90lbs of resin per lineal foot.</p>
4.12 Mechanical Properties	<p>Excess resin migrates into pipe defects allowing a mechanical anchoring.</p>

4.13 Physical Properties	Flexural Strength 4,500-PSI "Minimum" Test Method: ASTM 790 Flexural Modulus 250,000-PSI "Minimum" Test Method: ASTM 790
4.14 Corrosion attack	Chemical Resistance Testing. Test Method: ASTM D5813 and F1216 See Independent Laboratory Testing: Microbac Corrosion Test.
4.15 Resin Saturation Method	The lining tube is positioned within the translucent inversion bladder forming a liner/bladder assembly. The assembly is vacuum impregnated with a thermo-set resin. The bladder is translucent, allowing the installer and inspector to visually verify the lining tube has 100% resin saturation.
4.16 Gasket Sealed End Seals	The mainline connection shall include a seamless molded flange shaped gasket attached to the main liner tube by use of stainless steel snaps. The gasket must be a minimum of 2.5mm and must retain this minimum thickness under installation pressures. Alternatively, the mainline liner tube shall include 4 hydrophilic O-rings (2 on each side of the service pipe). The lateral tube shall include a compression O-ring gasket attached six-inches from the terminating end of the lateral tube.
4.17 End Seal Test Data	The hydrophilic gasket seals shall include test data that supports substantial expansion properties so to form a watertight compression end seal at the terminating ends of the CIP-lateral liner. The test protocol shall simulate subterranean conditions and hydraulic loading at surface. Gasket seal submittals must include tests data simulating hydration/ dehydration conditions for a period of 10,000-hours and the test results must successfully demonstrate and document long-term performance without deterioration, loss of material, flexibility, and expansion of the gasket during repeated cycles of hydration and dehydration.
4.18 Installed at one-time	The system allows only one (1) lateral at a time to be renewed within a MH-MH reach. The steam cure resin system allows many laterals to be renewed in a day. Conditions and number of laterals within a manhole run greatly determine the number of laterals that can be renewed in one-day, though a typical number of laterals renewed in one-day is five (5).
4.19 Missing Pipe Sections	The liner can span small missing sections of pipe.
4.20 Effects of Line and Grade	There are no effects caused by grade changes since air pressure is used to inflate the liner. The liner is flexible during insertion and can accommodate and negotiate 22, 45 and 90 degree bends.
4.21 Protruding Lateral Pipes	It is recommended protrusions into the main pipe are limited to ½-inch.
4.22 Reduction in Pipe Diameter, and its Effect	The liner exhibits a slick and typically smooth interior with a co-efficient that increases flow-rate. Minor wrinkling may occur at bends of 45-degrees and greater and some wrinkling may occur based on actual inner pipe diameter, inner surface, pipe configuration and conditions.
4.23 Homeowner Impact	Homeowners and building occupants at a minimum will receive a door knob notice bulletin 48 hours prior to the scheduled work and personal contact is attempted to be made the day of the scheduled work. The notice bulletin summarizes the scope of work, tentative time of service disruption and home/building owner cooperation for non-use of water/sewer for a 2-hour period or less. A brief explanation of "Dry Fixture Traps" is also included.

ITEM 5.

5.0 Sewer preparation involves cleaning and a flow stoppage or diversion period.	The main and the laterals are cleaned utilizing high-pressure water and mechanical cleaning tools. Pressures may range from 2,000 to 4,000 PSI removing all roots, debris and obstructions. Cleaning of the lateral is performed robotically from the main pipe. Any protruding service connections will be removed prior to liner insertion. The current condition of the pipe will be compared to the original designed condition to verify that design parameters have not changed. Normal mainline flows are plugged or by-passed during the process, depending on flow.
5.1 Mainline Service	Typical time for plugging the mainline is one-hour (1) or less.
5.2 Specific Requirements	Accesses to the upstream and downstream manholes are mandatory.
5.3 Cleanout System	<p>Lateral lengths 3.0-feet and less are renewed without the need for a cleanout. Lengths greater than 3.0-feet require a TEE shape, or back to back WYE shaped cleanout fittings located a minimum of two-feet (2') upstream from the terminal end of the lateral CIPP liner.</p> <p>The VAC-A-TEE® System is used to install a TEE shaped cleanout utilizing vacuum excavation. The saddle is specifically designed to snap fit to the host pipe as the lower most portion of the saddle extends beyond the spring-line of the pipe. This tight fitting snap firmly holds the saddle until the adhesive sealant is cured. The adhesive/sealant is specifically designed to adhere the PVC saddle to a variety of pipe materials. Each cleanout saddle is hydrostatically tested</p> <p>See Specification LMK's VAC-A-TEE Installation Specification.</p>
5.4 Installation Crew and Equipment	A typical crew consists of (3 to 4) technicians. A mobile wet out unit is required for onsite vacuum impregnated of the liner. Traffic disruption is minimal. The installation process is typically quick, efficient and non-disruptive when compared to open cut replacement methods.
5.5 Handling Sewer Access (i.e., existing manholes)	Certified and Licensed Technicians remotely carry out the installation. Internal pipe cleaning, inspection and insertion of the lining are typically performed without the need for confined space entry. Entry into a manhole may be required in order to insert a sewer plugs or to assist insertion of equipment in small diameter manholes or where drop inlets exist. If confined entry is required, Federal, State and local laws apply.
5.6 Inversion/Inflation Method	Air pressure is applied to launching device causing the Liner/Bladder Assembly to inflate the mainline portion and invert the lateral portion into the lateral pipe. The bladder extends past each terminal end of the lining assembly so the ends remain open and no cutting is necessary.
5.7 Maximum Length	Maximum length for a continuous lateral lining is 200 feet.
5.8 Curing Method	The Resin/Catalyst packages are proprietary to LMK Technologies. The resin systems are either cured at ambient temperatures or steam cured. Polyester/Vinyl-ester Ambient: One hour pot time/One hour cure time. Polyester/Vinyl-ester Steam: 2-hour pot time/30-minute cure time. Epoxy Ambient: One hour pot time/Two hours cure time. Epoxy Steam: 2-hour pot time/30-minute cure time.

5.9 Removal of Inflation Device	The bladder is re-inverted peeling away from the new cured in-place pipe. During the removal process, the bladder is drawn back into the launching device.
5.10 Equipment Removal	Once cured, the equipment is removed from the mainline pipe.
5.11 Document Final Video and Testing Procedures	A final video inspection is performed from the main if the termination point of the liner can be seen with zoom cameras.
5.12 Design Life	50-Year Design Life based on assumption described in ASTM F1216 Appendix X1 and long-term creep as described in ASTM D2990.

ITEM 6.

6.1 Technology Introduced	T-Liner has been commercially available since December of 1996.
6.2 Installed Locations	USA, Canada, Mexico, Denmark, Sweden, Germany and Singapore
6.3 Quantity of Installations to Date	60,000 plus. See addendum A for project reference list (not a comprehensive listing).
6.4 Approved and Trained Installers	Arold Construction, B. Frank Joy, Hyattsville, MD Bravo Environmental, Tukwila, WA C & L Water Solutions, Littleton, CO D.M. Robichaud Assoc., Oshawa, Ontario Hoerr Construction, Peoria, IL IVIS, Edmonton, Alberta Kissick Construction, Kansas City, MO LMK Pipe Renewal, Ft. Lauderdale, FL Midlands Contracting, Kearney, NE Mocon Corporation, Honolulu, HI Musson Brothers, Rhinelander, WI Performance Pipelining, Ottawa, IL Pipevision, LaSalle, IL Prism Contractors & Engineers, Inc., Yorktown, VA Precision Pipelining, Marseilles, IL Quam Construction, Willmar, MN South Baldwin Plumbing (SBP Inc.), Pensacola, FL The Iron Horse Group, Fairview, OR United Pipe Renewal, Johnston, IA XL Contracting, St. Peters, MO

ITEM 7.

Advanced Materials:

- **Translucent Inversion Bladder**
- **Liner/Bladder Assembly**
- **Vacuum Impregnation**
- **Installed from the main pipe up into the lateral**
- **Full circle one-piece Main/Lateral Lining**
- **Continuous lengths up to 200'**
- **Curing system as fast as 30-minutes**
- **Structural CIPP**
- **10,000 hour CIPP chemical resistance testing ASTM D29990**
- **Flexible construction**
- **Remote installation where no excavation is required**
- **Gasket Sealing Technology (hydrophilic and/or compression gaskets)**
- **10,000 hour hydration/dehydration gasket sealing test**

Respectfully Submitted By:

Larry Kiest, Jr.

Larry Kiest, Jr., President, LMK Technologies, LLC.

Last Updated 4/30/15

LMK PROJECT REFERENCE LIST*

Owner Information-Name	State	Contact	Phone Number or e-mail address	QTY of T-Liners Installed	Year of Installation	In Service the last 5 years
Naperville	IL	John Vose	630-420-6741	1400	1998	
Kissimmee	FL	Mike Johnson	407-518-2269	500	2004	
Stark	FL	Joe Miller	850-521-0344	317	2005	
Prince William Service Authority	VA	Rob Wilson	703-335-7996	1100	2005	
Malcolm Pirnie	DE	Jim Shelton	302-884-6906	715	2006	
Miramar	FL	Hong Guo	954-538-6825	2	2006	
Broward County	FL	Ethan Heijn, P.E.	954-987-0066	32	2007	
Margate	FL	Gus Gustitus	954-972-0828	4	2007	
Miami Dade County	FL	Ethan Heijn, P.E.	954-987-0066	151	2007	
North Miami Beach	FL	Pedro Melo	305-733-1187	189	2007	
North Miami Beach	FL	Pedro Melo	305-733-1187	22	2007	
Ocean Reef	FL	Jeff Oeltjen	305-522-1706	4	2007	
Pembroke Pines	FL	Dan Pringle	954-435-6511	6	2007	
St. Petersburg	FL	Fred Tingberg	954-973-9700	14	2007	
Manassas/B. Frank Joy	VA	Sharon Shelton	301-679-9499	35	2007	
Hollywood	FL	James Mortel	954-921-3930	5	2008	
Bay Harbor Islands	FL	Randy Daniel	305-866-6241	49	2008	
Broward County-Reynolds	FL	Ethan Heijn, P.E.	954-987-0066	8	2008	
Clermont	FL	Paul Billingsley	352-241-0178	27	2008	
Coral Springs	FL	Dave Moore	654-345-2167	4	2008	
Deerfield Beach	FL	Fred Scott	954-480-4403	16	2008	
Largo	FL	Jim Weaton	727-424-5121	45	2008	
Monticello	FL	Joe Miller	850-521-2269	115	2008	
North Miami Beach	FL	Pedro Melo	305-733-1187	3	2008	
Plantation	FL	Darryl Richardson	954-673-0836	8	2008	
Plantation	FL	Darryl Richardson	954-673-0836	12	2008	
St. Petersburg	FL	Mark Laney	727-420-8931	13	2008	
Town of Medley	FL	Joe Soto	305-889-1915	6	2008	
Wilton Manors	FL	Dave Archacki	954-818-7315	611	2008	
Coral Gables- MP	FL	Louis Woska	866-423-6621	8	2009	
Bay Harbor Islands	FL	Randy Daniel	305-866-6241	18	2009	18
Brooksville	FL	Laureen Busacca	352-544-5465	70	2009	70
Cooper City	FL	Jeff Robertson	954-434-5519	24	2009	24
Deerfield Beach	FL	Fred Scott	954-480-4403	7	2009	7
Hialeah	FL	Armando Vidal	305-556-3800	28	2009	28
Margate	FL	Gus Gustitus	954-972-0828	15	2009	15
North Key Largo Utilities	FL	Bob Orr	305-522-3854	8	2009	8
North Lauderdale-Reynolds	FL	Joe Santi	954-724-7070	10	2009	10
Pembroke Pines	FL	Dan Pringle	954-435-6511	16	2009	16
Plantation	FL	Darryl Richardson	954-673-0836	6	2009	6
Knoxville	TN	Kenny Zinzer	865-670-667	14	2009	14
Town of Leesburg	VA	Hank Woodward	703-737-7074	20	2009	20
Boca Raton	FL	John Sfiropoulos	561-338-7382	31	2010	31
Coconut Creek	FL	Chad Hancock	954-448-9066	6	2010	6
Cooper City	FL	Jeff Robertson	954-434-5519	32	2010	32
Deerfield Beach	FL	Fred Scott	954-480-4403	28	2010	28
Lee County Utilities	FL	David Sabiston	239-693-2992	15	2010	15
North Miami	FL	Pedro Melo	305-733-1187	12	2010	12
Orange County	FL	Pat Dean	954-563-4233	77	2010	77
Palm Beach County WUD	FL	Adam Galicki	561-493-6122	23	2010	23
Pembroke Pines	FL	Dan Pringle	954-435-6511	30	2010	30
Pembroke Pines	FL	Joe McLaughlin	954-435-6511	10	2010	10
Wilton Manors	FL	Dave Archacki	954-818-7315	139	2010	139
Downers Grove Public Works	IL	Bob Swirsky	630-969-6753	200	2010	200
Village of Glen Ellyn	IL	Robert Greenburg		40	2010	40
St. Louis MSD	MO	Ron Moore	314-768-6200	225	2010	225
City of Oconomowoc	WI	Tom Steinback		15	2010	15
City of Coral Springs	FL	Mike Medley	954-345-2189	14	2010	14
City of Hollywood	FL	James Mortel	954-980-2244	45	2010	45
City of Pinellas Park	FL	Jim Davis	727-541-0771	50	2010	50
MDWASD	FL	George Dansoh	786-268-5324	9	2010	9
City of Plantation	FL	Darryl Richardson	954-673-0836	98	2010	98
City of Largo	FL	Leoano Dicus, P.E	727-439-0137	35	2010	35
New Castle County	DE	Jason Nelson		625	2011	625
Fort Lauderdale	FL			425	2011	425
Rock River Reclamation	IL	Mike Rieger		375	2011	375
South Palos Township	IL	Robinson Engineering		65	2011	65
City of Oshkosh	WI	Justin Gierach		65	2011	65
City of Racine	WI	Jason Herzog		450	2011	450
Collier County	FL	James Sainvilus	239-591-0186	50	2011	50
Dade City	FL	Art Kitchens	352-523-5054	45	2011	45
Broward County	FL	Mark Gabriel, P.E.	954-831-0798	120	2011	120
Lautrec, Ltd.	FL	Timothy Klein	248-737-1413	37	2011	37
Indian Rocks Beach	FL	Dean Scharmen	727-595-6889	10	2011	10
City of Pinellas Park	FL	Jim Davis	727-541-0771	9	2011	9
Coral Springs	FL	Mike Medley	954-345-2189	65	2011	65

City of Hallandale	FL	Louis Granda	954-457-1629	108	2011	108
City of Plantation	FL	Darryl Richardson	954-673-0836	12	2011	12
Pembroke Pines	FL	Joe McLaughlin	954-435-6511	25	2011	25
City of New Albany	IN	Wes Christmas, PE		124	2012	124
City of Greenfield	WI	Sean Sullivan		12	2012	12
City of Milwaukee	WI	Yousef Zafar		2500	2012	2500
City of West Allis	WI	Joe Birch		125	2012	125
Charolette Count	FL	Charlie Rine	941-764-4555	3	2012	3
Pinellas County				7	2012	7
City of Boynton Beach	FL	George Peck	651-742-6437	4	2012	4
Cooper City	FL	Jeff Robertson	954-434-5519	26	2012	26
Washington-WSSC	VA	Matthew Calahan	301-277-1983	10	2012	10
Deerfield Beach	FL	Fred Scott	954-480-4403	30	2012	30
Hollywood	FL	James Mortel	954-921-3930	97	2012	97
City of Fort Pierce	FL	Mark Kobbe	772-466-1600	33	2012	33
One Plantation Place	FL	Mark Carpenter	305-825-9800	16	2012	16
Bay Harbor Islands	FL	Randy Daniel	305-866-6241	18	2012	18
Coral Gables	FL	Batista Giovanni	305-460-5069	72	2012	72
City of Lauderhill	FL	Indar Maharaj	954-391-2810	27	2012	27
City of Oakland Park	FL	Susan Smith	954-630-4432	49	2012	49
City of Sarasota	FL	Susan Blake	941-365-4840	19	2012	19
Coral Springs	FL			220	2013	220
Palm Beach County WUD	FL	Adam Galicki	651-493-6122	12	2012	12
County Lakes MHP	FL	Rick Wilson, P.E.	407-721-6954	75	2013	75
Hallandale	FL			30	2013	30
Hollywood	FL			26	2013	26
Markham	IL			122	2013	122
Naperville	IL			172	2013	172
Rolling Meadows	IL			88	2013	88
Wheaton	IL			199	2013	199
City of Toronto	ON			147	2013	147
Tipton, PA	PA			86	2013	86
Brentwood	TN			60	2013	60
Ft Meade	VA			53	2013	53
Roanoke	VA			14	2013	14
Brookfield	WI	Dave Carlson	262-782-9650	35	2013	35
City of Glendale	WI	Dave Eastman		21	2013	21
City of Wauwatosa	WI	John Dess		120	2013	120
Village of Mount Pleasant	WI	Robert Pucely		105	2013	105
Village of Shorewood	WI	Tom Nanning		17	2013	17
Euclid				66	2013	66
Ft. Sasa				141	2013	141
Indian Rocks Beach	FL	Dean Scharmen	727-595-6889	27	2013	27
City of Fort Myers	FL			60	2013	60
Deerfield Beach	FL			44	2013	44
Homestead- MP	FL			36	2013	36
Plantation	FL			15	2013	15
Fort Myers- McGregor	FL			44	2013	44
MAER Construction	FL			18	2014	18
New Castle County	DE	Ed Strauss, P.E.	302-781-5957	70	2014	70
Indianapolis	IN	Roger Hanas	rhanas@citizensenergygroup.com	139	2014	139
Southshore	KY	Jeff Reynolds	jdreynolds@HMBpe.com	27	2014	27
Belgrade	MN	Dave Blommel	dblommel@sehinc.com	225	2014	225
Golden Valley	MN	Burt Tracy	btracy@goldenvalleymn.gov	35	2014	35
Ivanhoe	MN	Scott Moyer	scottm@bannerassociates.com	240	2014	240
Omaha	NE	Jorge Rivero	jorge.rivero@cityofomaha.org	83	2014	83
Clermont	OH	Jeff Goetz	jgoetz@cvlermontcountyohio.gov	166	2014	166
Euclid	OH	Joe Tartabini	joe@unitedsurveyinc.com	67	2014	67
Lyndhurst	OH	Jim Kushner	jkusner@cuyahogacounty.us	39	2014	39
Walbridge	OH	Dan Wickard	dwickard@nwwsd.org	35	2014	35
Franklin	VA			26	2014	26
Dania Beach	FL			70	2014	70
Lee County Utilities	FL			260	2014	260
North Miami Beach	FL			239	2014	239
Gendale	WI	Dave Eastman	D.Eastman@gtlendale-wi.org	26	2014	26
Hastings	WI	Dave Chalmers	dchalmers@hastingsmn.gov	40	2014	40
Mount Pleasant	WI	Steve Houte	shoute@mtpleasantwi.gov	34	2014	34
Shorewood	WI	Mustafa Emir	mustafa.emir@clarkdietz.com	52	2014	52
City of Sarasota	FL			44	2014	44
Hillsborough-MP	FL			100	2014	100
Clermont	FL			25	2014	25
Saddle Bag Lake MHP	FL			61	2014	61
City of Largo	FL	Leoano Dicus, P.E	727-439-1037	50	2014	50
Totals				16655		11234

* This is not a comprehensive list of all projects installed. LMK Contractors have installed over 10,000 liners from Jan. 2012 to Dec. 2014. Contact LMK Technologies if a specific geographic reference is needed not herein listed.

LMK Technologies certifies that the average length of T-Liner laterals is 30 ft. With over 10,000 liners installed during the time frame from Jan. 2012 to Dec. 2014, over 300,000 linear feet of liner has been installed.