TOWN OF CLARKSTOWN
DEPARTMENT OF ENVIRONMENTAL CONTROL

CLARKSTOWN SANITARY LANDFILL REMEDIATION AND LANDFILL CAPPING

CONTRACT NO. 34-1996

CONSTRUCTION CERTIFICATION REPORT

APPENDIX I: DRAINAGE CONTROL STRUCTURES

April 14, 2000

Prepared for:
Town of Clarkstown
Department of Environmental Control
10 Maple Avenue
New City, NY 10956

Submitted to:
New York State Department of Environmental Conservation
Division of Environmental Remediation
50 Wolf Road
Albany, NY 12233

Prepared by:
Roy F. Weston of New York, Inc.
130 West 30th Street
New York, NY 10001

WESTON®
MANAGERS DESIGNERS/CONSULTANTS

APPENDIX I: DRAINAGE CONTROL STRUCTURES

Appendix I1:	Turf Reinforcement Material Certificates
Appendix I2:	Rip-Rap Stone Data
Appendix I3:	HDPE and CMP Drainage Pipes and Concrete Headwalls Data
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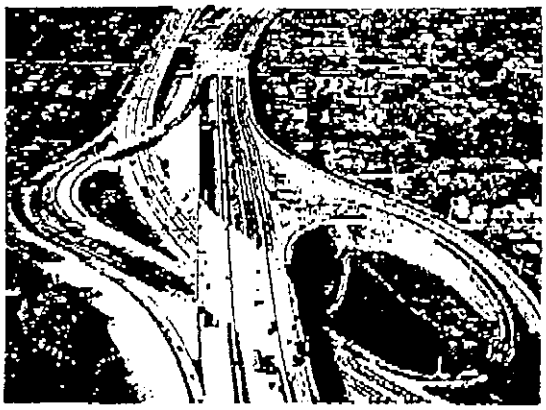
APPENDIX I1:

Turf Reinforcement Material Certificates

EROSION CONTROL/TEMPORARY DEGRADABLE

Product Name	Physical Properties: Product Type [1]	Composition	Color	Mass Per Unit Area ASTM D 5261 g/m² (oz/yds²)	Recommended Maximum Slope Batter H:V	Limiting Shear Stress Bare Soil @ X hrs Kg/m² (lbs/ft²)	Manufacturer's Suggested Applications
American Excelsior Co.							
Curlex II (Double Net)	**EC8**	**100% aspen excelsior, netting top and bottom**	**natural or Quickgrass (green)**	**532 (15.7)**	**1.5:1**	**83.8[B] (1.75)**	**steep slopes and moderate flow channels**



CURLEX PROTECTS RIGHT-OF-WAYS

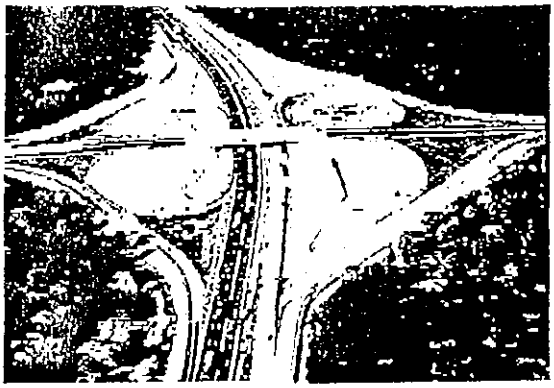
American Excelsior's Curlex II blankets were used to provide a stable environment for seeds to grow, while preventing excessive soil and seed loss through wind and water erosion on the right-of-ways along the Illinois Tollway.

excessive soil and seed loss through wind and water erosion." says Mr. Bob Klatt, Landscaping Coordinator for the Tollway Authority. "It also allows the seeds to establish and germinate. Once that is done, the blanket biodegrades and goes back into the environment and the seed has a head start."

The blankets combine a dense mat of curled and seasoned Aspen wood excelsior with a tough, photodegradable plastic mesh which remains in place even on rough terrain. As Curlex fibers become wet, they expand. As moisture is released, the fibers contract. This natural motion creates a digging effect, maintaining superior soil adhesion.

The Illinois Tollway Authority has installed roughly three million square feet of the blankets on the project at a cost of less than four percent of the total landscape and restoration budget which, according to Mr. Klatt, "is very economical for complete erosion control."

Although the Illinois Tollway Authority has a longstanding relationship with American Excelsior, they have used other erosion control blankets in the past. "We have used another manufacturer's straw blanket and found it to be okay. However, we had problems with them curling, and since they were lighter than the Curlex blanket, we found that they tended to blow and rip from the wind caused by passing trucks along the roadway," says Mr. Klatt. "Although we want our highways to look nice and pretty, the green grass, landscaping and beauty of some of our tollways is only a side benefit. Our primary concern is that our landscaping is functional: that our trees screen roadway noise and pollution; and, that our grassed areas deter erosion," he adds.



At A Glance:

Project:	Highway Right-Of-Way
Location:	Illinois State Toll Highway
Product:	Curlex II Double-Sided Blanket
Application:	Slopes and right-of-way areas
Job Size:	75,000 Acres
Manufacturer:	American Excelsior Company

American Excelsior Company
EARTH SCIENCE DIVISION
AN EMPLOYEE OWNED COMPANY

850 Avenue H East
Arlington, TX 76011
817-640-1555, (800) 777-SOIL
Fax: 817-649-7816

Geosynthetic Products Division

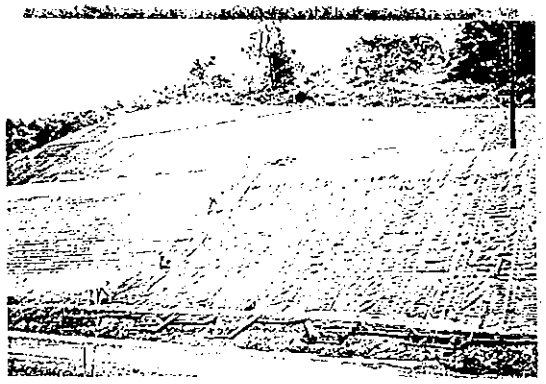
Smart Solutions in Synthetics™

LANDLOK®

LANDLOK®
Turf Reinforcement Mats

Biotechnical Composites™
in balance with nature.

- Roadside Ditches
- Stormwater Channels
- Detention & Retention Basins
- Banks & Shorelines
- Dams, Dikes & Levees
- Landfill Slopes & Diversion Ditches
- Steep Slopes
- Geosynthetic Reinforced Soil Structures



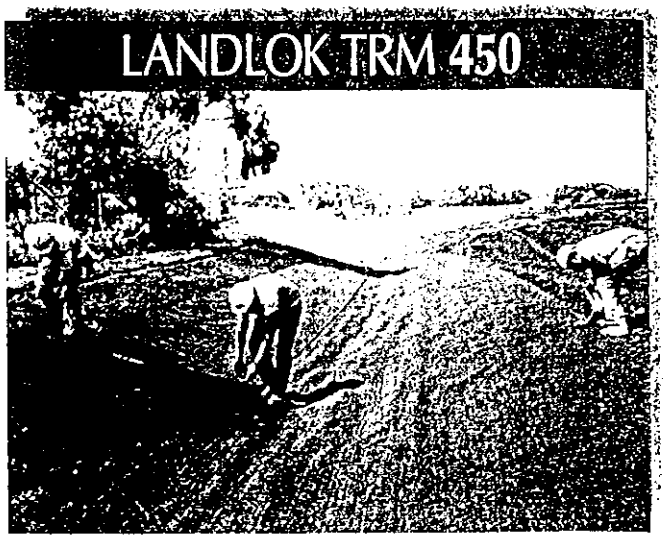
SYNTHETIC INDUSTRIES

Designed for "Balanced" Performance

LANDLOK turf reinforcement mats are effective from the moment they are installed, providing superior temporary erosion protection, rapid vegetative establishment, and outstanding long term erosion resistance to tractive forces (shear stresses) associated with high flow velocities in steep slopes and channels.

LANDLOK TRM 1060 consists of a lofty three-dimensional web of black polyolefin fibers positioned between two high strength, biaxially oriented nets mechanically bound together by polyolefin stitching to form a dimensionally stable matrix. LANDLOK TRM 1060 has sufficient thickness (17 mm or 0.7 inch) and void space (> 90%), balanced with optimal ground cover (≈ 75%) to allow soil filling and/or retention as well as emergence of plants from beneath or within the matrix. Soil, the "quintessential mulch," acts as a womb to induce seed germination, nurture seedling development and allow the root system to become entangled with the geosynthetic matrix.

Water quality benefits make LANDLOK the preferred lining material for stormwater channels.



Easy to install, lightweight LANDLOK erosion mats come in standard widths of 2 and 4 meters (6 1/2 and 13 feet).

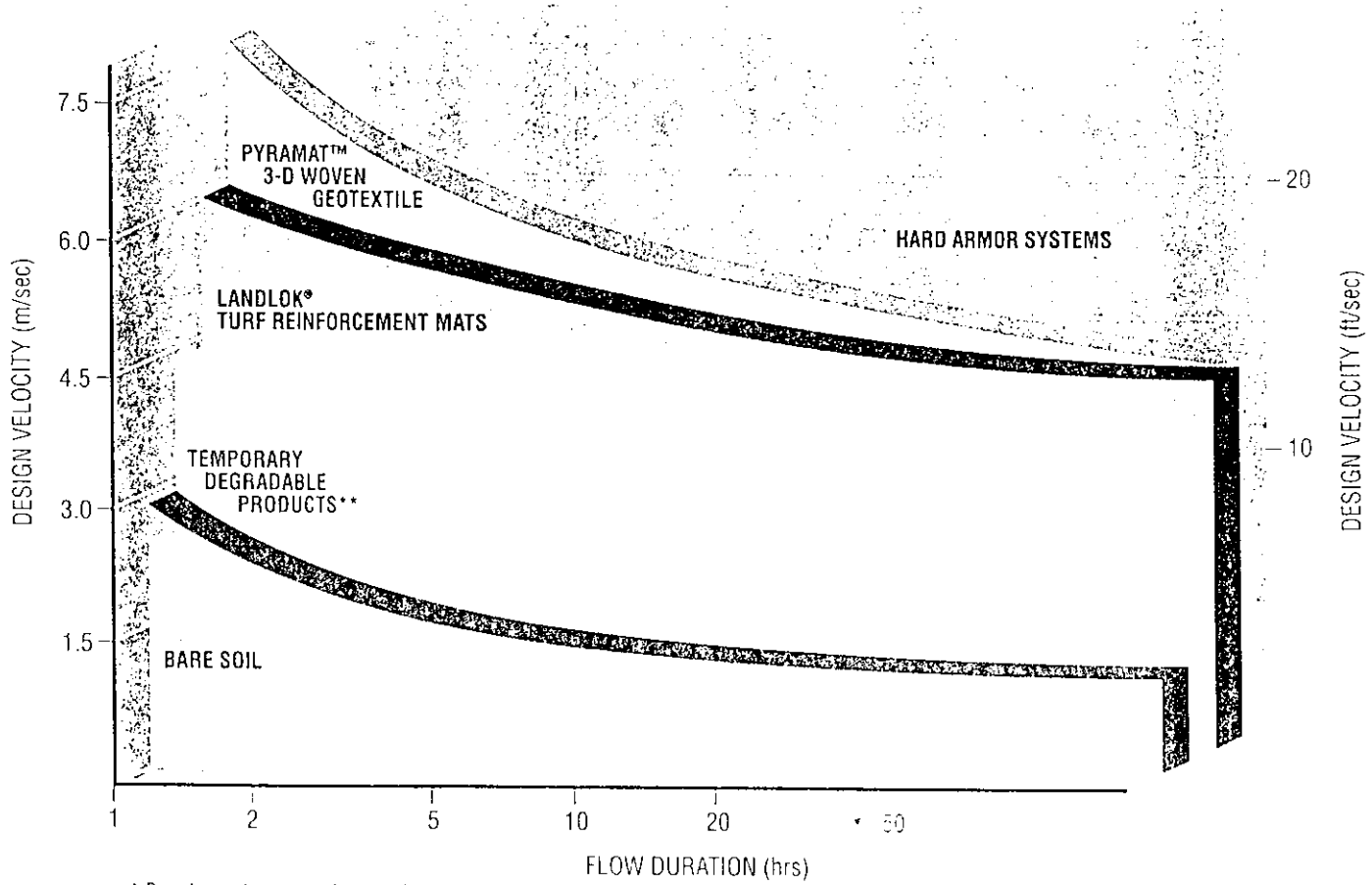
LANDLOK TRM 450 is comprised of a dense, three-dimensional web of green polyolefin fibers oriented and mechanically bonded between two nets. This matrix has been designed to be non soil-filled in order to provide maximum erosion protection through increased ground coverage (≈ 85%), while allowing immediate aesthetics and growth of vegetation through the mat. LANDLOK TRM 450 is generally placed above a seeded surface and relies upon sediment capture rather than soil filling for increased stability. Superior strength, performance and durability separates this TRM from temporary degradable "high velocity" organic blankets.

Long Term Performance

The graph below illustrates maximum permissible limiting velocities versus flow duration compiled from existing published evaluations of geosynthetic mattings and classic erosion control studies. Additionally, erosion control materials are grouped into cost effective performance niches.

Flow values for the various temporary erosion control mulches, blankets, meshes and rovings are footnoted because performance of these materials under extended flow durations has not been reported. From the moment of installation, these materials are vulnerable to short term, moderate flow velocities. As degradation progresses, long term performance will be reflected solely in the density of vegetation established, with no reinforcement capabilities. Is temporary erosion protection adequate for your project?

LONG TERM PERFORMANCE GUIDELINES*



* Based upon long-term (>30 hour) flow data.
** Includes erosion control blankets, fiber rovings, stems, hydraulic/straw mulches, etc

PRIOR TO DESIGNING A PROJECT, DEMAND LONG TERM TEST DATA!

For additional information regarding research and performance data or for design assistance, please contact Engineering Services at Synthetic Industries – Geosynthetic Products Division at (800) FIX-SOIL.

APPENDIX I2:

Rip-Rap Stone Data

TILCON NEW YORK INC. P.O. Box 362 Haverstraw, NY 10927 914 638 1300

Certificate of Compliance

September 17, 1996

Bid Item 8A / NYSDOT "Light" Rip Rap for aprons

Bid Item 8B / NYSDOT "Fine" Rip-Rap for channels

Dean La Fleur
Ogden Remediation Services
285 Davidson Ave
Somerset, NJ 08873

Re: Clarkstown Landfill Project

Dear Sir:

The Tilcon New York Inc. Haverstraw quarry is a New York State D.O.T. approved material source. Enclosed please find source approval. The source number is 8-10R and the test number is 95AR9.

Also enclosed are proctors for Tomkins Cove and Haverstraw Pond dredgings and of the NYS #3, NYS # 1's & 2's, ASTM #8's and subbase 304.05 NYS Item 4, produced at the Haverstraw plant.

The Fine & Light Stone Fill items produced at the Haverstraw plant conform to the following:

Bid Item

(3B) Fine Stone Fill

Stone Size	% of Total by Weight
Smaller than 8ins	90-100
Larger than 3ins.	50-100
Smaller than # 10 Sieve	0-10

(8A) Light Stone Fill

Lighter than 100lbs	90-100
Larger than 6ins.	50-100
Smaller than 1/2"	0- 10

If you have any questions, please call me.

Sincerely,

TILCON NEW YORK INC.

Morsia Thomas

Morsia Thomas
Director, Quality Control

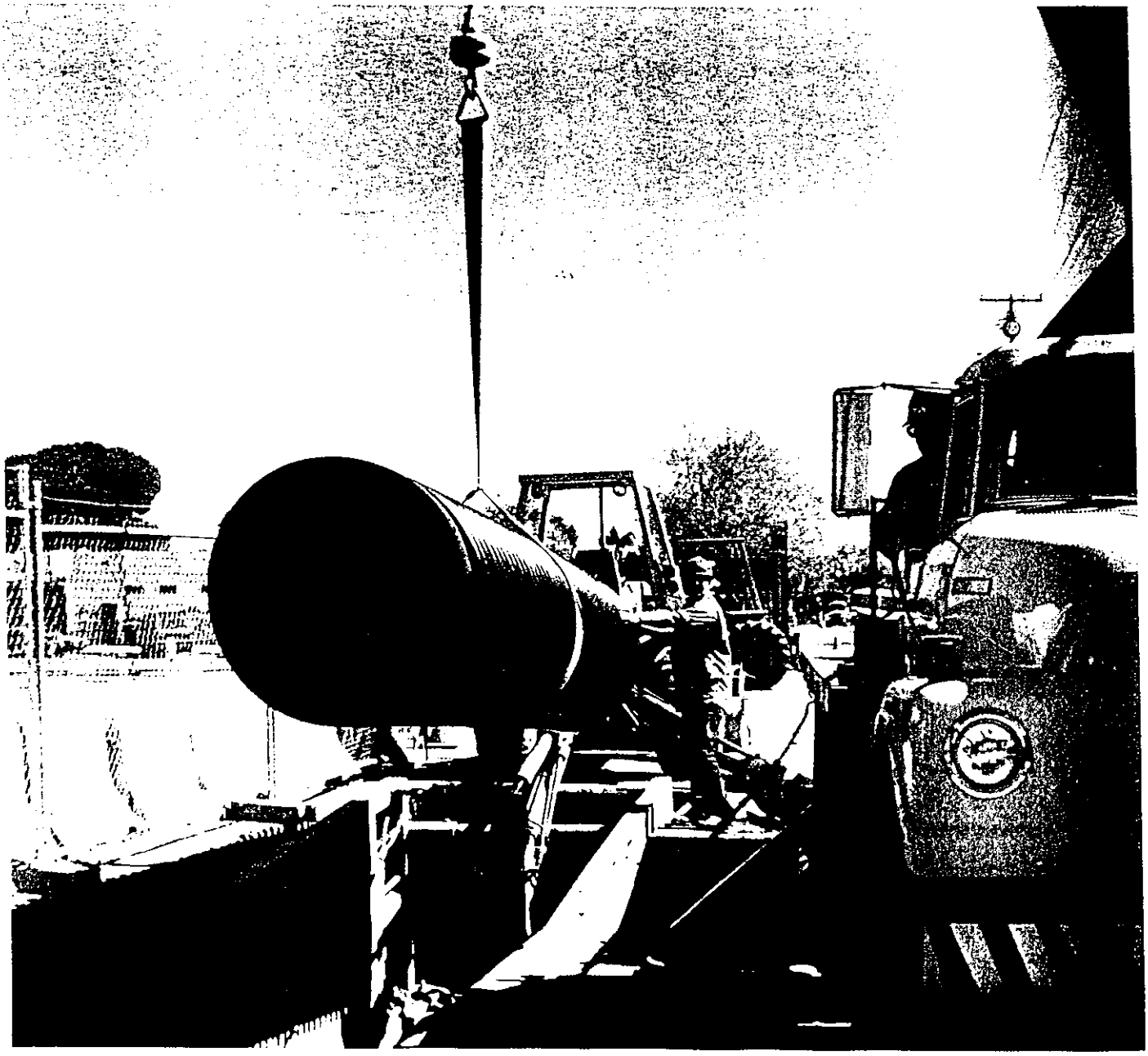
APPENDIX I3:

HDPE and CMP Drainage Pipes and Concrete Headwalls Data

ASTM F-894
HIGH-DENSITY
POLYETHYLENE PIPE
PRODUCT DATA

Spirolite®

Chevron



Bulletin No. 910

diameter plastic pipe.

PIPE MATERIAL

Spirolite® is manufactured from a high density, high molecular weight polyethylene especially designed for engineered piping applications. This material has been used successfully to make pipe for over 30 years. The resin selected for **Spirolite®** offers the optimum combination of strength, stiffness, toughness and long-term reliability (see Figure 1). The material is classified by ASTM D-1248-84 *Standard Specification for Polyethylene Plastics Molding and Extrusion Materials* as Type III, Class C, Category 5, Grade P34. Other grades of HDPE and materials may also be selected based on application requirements.

ESCR

Some grades of polyethylene may crack or craze when under stress and in contact with certain chemical substances. This phenomenon is known as environmental stress cracking. **Spirolite®** pipe is made from stress-crack resistant materials which, when tested under the most severe ESCR test conditions (ASTM D-1693, Condition C), produce a result that far exceeds the ASTM D-1248-84 requirements for the highest-rated pipe materials.

WEATHERABILITY

Although **Spirolite®** pipe has been primarily designed for buried applications, it is weather resistant—it may be stored or used for years in direct exposure to the natural elements. The pipe compound contains a minimum of 2% carbon black, as specified by ASTM D-1248-84 for weather resistant (Class C) grades. This additive screens out the sun's potentially damaging ultraviolet rays and preserves the pipe's properties.

CHEMICAL AND CORROSION RESISTANCE

The outstanding chemical and corrosion resistance of **Spirolite®** pipe makes it ideal for sanitary sewer and a wide variety of industrial waste disposal applications. It will not rust or decay or support bacteriological growth and is not subject to electrolytic or galvanic corrosion. **Neither hydrogen sulfide nor the resulting sulfuric acid commonly found in sanitary sewers has any effect on the physical properties of Spirolite® pipe.** A comprehensive chemical resistance brochure is available on request.

Spirolite®
Meets ASTM F-894

FIGURE 1: CELL CLASSIFICATION DESCRIPTIONS PER ASTM D-3350*

CELL CLASSIFICATION FOR SPIROLITE BASE RESIN PE 3408	PROPERTY	CELL CLASSIFICATION LIMITS
3	Density per ASTM D-1505, gm/cm³	0.941 - 0.955
3	Melt Index per ASTM D-1238, gm/10 min	< 0.4 - 0.15
5	Flexural Modulus per ASTM D-790, psi	110,000 - 160,000
4	Tensile Strength per ASTM D-638, psi	3000 - 3500
3	Environmental Stress Crack Resistance per ASTM D-1693, Failure- = hours	F_{50} > 192
4	Hydrostatic Design Basis per ASTM D-2387, psi	1600
C	Color & Ultraviolet Stabilizer	> 2% Carbon Black

*Base resin. Pipe values may vary. HDB established when compounded with the proper color concentrate. Cell classifications are minimum cell values. Resins with higher cell values may be used.

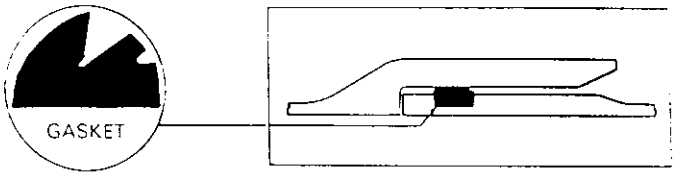
TOUGH AND DURABLE

Spirolite® is rugged. It withstands stresses that would normally damage conventional piping products. Its resistance to cracking and breakage through customary jobsite handling eliminates the need to order extra pipe.

JOINING

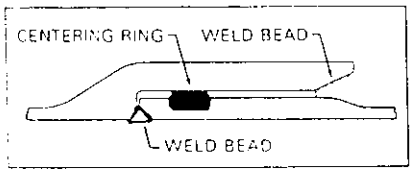
Spirolite® pipe may be joined by two alternative techniques, each employing the ease of bell and spigot assembly. These are rubber gasket and thermal welding. Together, they allow the specifier the option of selecting that method which is best suited to the application.

RUBBER GASKET JOINT



The **Spirolite®** gasket is designed to meet ASTM F-477. This easily assembled joint is perfect for sanitary sewer and most industrial waste applications and is available in 18" through 84" diameter **Spirolite®**. The gasket will not "fishmouth" or roll out of its grove when homed. Because of its unique profile shape, the gasket provides dual sealing: a compression seal against exfiltration and a combination of compression and hydraulic seal against infiltration. This provides double protection. The hydraulic seal is energized by external pressure, thus, it becomes tighter with increasing infiltration pressure. This unique design is superior to an O-ring seal which provides only a compression seal. The **Spirolite®** joint passes standard air or hydrostatic field testing with ease and is designed in accordance with ASTM D-3212 *Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals.* **Infiltration rates not to exceed 50 gallons/inch of diameter/mile/day may be specified for the Spirolite gasket joint.** Recommended assembly procedures for the gasket joint are given in Spirolite Technical Bulletin TB-100.

THERMAL WELDED JOINT

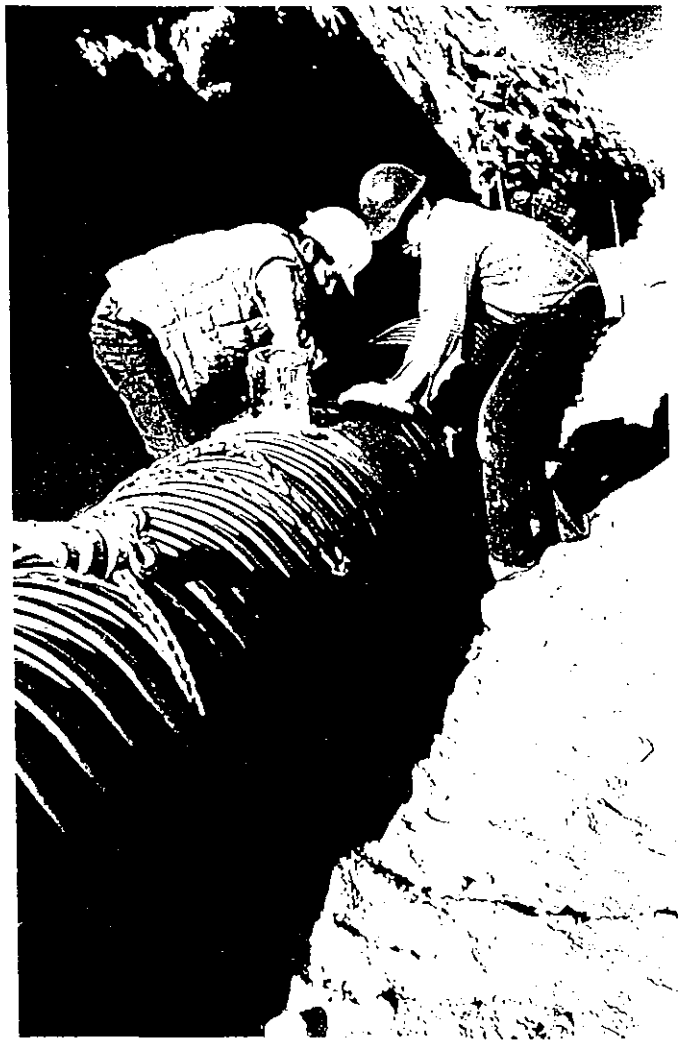


The **Spirolite®** thermal welded joint is used primarily for applications where contact with exotic effluents is anticipated. Using a portable field extruder, a bead of polyethylene is extruded and fused to the juncture of the bell and spigot to form a homogenous joint which is absolutely leak proof. The weld bead may be placed on the inside or outside of the pipe or both.

MANHOLES AND FITTINGS

For complete corrosion-resistant systems, **Spirolite®** manholes are available. These manholes can be fabricated to permit connection to **Spirolite®** pipe, as well as traditional piping materials. **Spirolite®** pipe can also be connected to traditional types of manholes. See Spirolite Technical Bulletin TB-[illegible] for available connection options.

A full range of fittings is available for use with **Spirolite®** pipe. All standard fittings are designed with bell and spigot end configurations for easy assembly to **Spirolite®** pipe. In addition to standard [illegible] fittings, flanges, and lateral taps, [illegible] custom fabricate those [illegible] required for special job



Assembling a **Spirolite®** joint

INSTALLATION

INTRODUCTION

Given similar trench conditions, a rigid pipe is generally subjected to a considerably greater load than a flexible pipe. With rigid pipe, the predominant source of support is the pipe itself. If not properly installed, failure can occur due to stress concentrations. Therefore, the failure of a rigid pipe is often catastrophic. **Spirolite®** is a flexible conduit. It can sustain controlled deformation without harmful effect. For burial installations, the beneficial features of flexible conduit are well recognized. Soil support forces are mobilized, greatly enhancing the pipe's load carrying capabilities, and excessive and concentrated loads are relieved. Requirements for achieving satisfactory construction of flexible pipe soil systems are not very different from those utilized with traditional piping products. General guidelines presented by ASTM D-2321 *(Standard Recommended Practice for Underground Installation of Flexible Sewer Pipe)* are applicable to **Spirolite®** pipe. The strength of flexible pipe soil systems has been repeatedly demonstrated by numerous laboratory tests and confirmed by extensive field experience.

The following summarizes general installation guidelines for plastic pipe. For specific applications, the installer should consult the Plexco/Spirolite Installation Guide prior to installing Spirolite pipe.

INSTALLATION

The key to a successful installation is achieving stable and permanent support of the pipe. For flexible pipe, adequate side support is as important as proper bedding. Bedding and initial backfill materials should be stable and compactible. Uniform and proper placement of materials around the pipe is necessary to obtain permanent support.

BEDDING

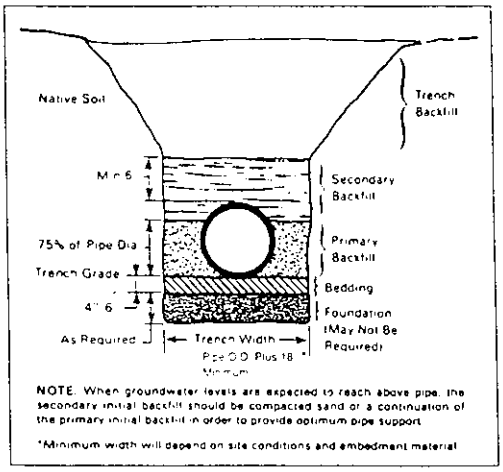
Pipe should be installed in a dry trench. All large rocks and clumps should be removed from the trench bottom. Bedding should be of the same material as the initial backfill and should be compacted to the same density as required for the initial backfill and extended to at least six inches over the top of the pipe. Bedding thickness is typically 4"-6". In unstable soils, additional bedding (or foundation) may be required to obtain a stable trench bottom.

HAUNCHING AND INITIAL BACKFILL

Proper placement and densification of embedment material in the haunching area is a key step toward proper installation. As indicated in Figure 8, only Class I, II, and III embedment materials are normally suitable for use with **Spirolite®** pipe. Proper installation requires even placement and compaction of these materials on both sides of the pipe from trench wall to trench wall, and normally from the trench floor to 6" above the crown of the pipe. This should be done in lifts which permit optimum consolidation of the backfill. Compaction levels of a minimum of 85% Standard Proctor Density for Class I and II materials and 90% Standard Proctor Density for Class III materials are required.

The initial backfill is divided into the primary zone and the secondary zone. (See Figure 9.) Primary zone materials contribute significantly to pipe support and are normally materials recommended in Figure 8. For most applications, above the ground water level it is only necessary to bring the primary zone material to a height equal to ¾ of the pipe diameter. The remainder of the initial backfill or the secondary fill can be any compactible material, including native soil. If the pipe is located beneath the water table, the secondary fill should consist of the same material as the primary initial backfill and both secondary and primary fill should be mechanically compacted with an impact tamper or vibratory sled. The second fill should extend above the pipe to the height noted in the Installation Guide.

FIGURE 9



Every precaution must be taken to ensure the long-term stability of the backfill system. This requires adherence to the recommended embedment procedure, as well as the availability of stable foundation, bedding, and trench wall conditions. Where unstable trench wall conditions exist, or where there is a possibility of ground movement, soil migration, or high water tables, special installation procedures may be required.

FINAL BACKFILL

Any material consistent with applicable job requirements can be used for final backfill. If the final backfill material contains large clumps or rocks which might cause point loading of the pipe crown, then a 2 foot layer of compacted select material must be added above the pipe before beginning final backfill.

PLEXCO® Plants

Abbeville, SC 29620-0249
P.O. Box 608
State Highway 32
(803) 446-2136
(803) 446-2139 (fax)

Colton, CA 92324-3530
1280 Jefferson Lane
(909) 420-5500
(909) 370-3787 (fax)

Fairfield, IA 52556-2151
1806 West Stone Avenue
(515) 472-3137
(515) 472-1658 (fax)

Knoxville, TN 37933-1530
P.O. Box 23530
10420 Lexington Drive
(423) 966-5822
(423) 675-9412 (fax)

Reno, NV 89506-2608
14381 Lear Blvd.
(702) 677-1700
(702) 677-1712 (fax)

Waxahachie, TX 75165-4709
1601 West 287 Bypass
(214) 937-0852
(214) 937-4530 (fax)

General Office

Bensenville, IL 60106-1048
1050 Busse Hwy. Suite 200
(708) 350-3700
(708) 350-2704 (fax)
As of 8/03/96, the Bensenville area code will be "630."

If you'd like to know more about PLEXCO products, call our General Office or your nearest Plant Location, or write for these additional brochures:

PLEXCO Product Literature

Fusion Procedures
Joining PLEXCO Polyethylene Pipe & Fittings
Bulletin No. 101

Industrial Piping Systems
Extra High Molecular Weight PE3408 High Density Polyethylene
Bulletin No. 104

Butt Fusion Procedures
Extra High Molecular Weight High Density Polyethylene PE3408 Pipe
Bulletin No. 108

Municipal Piping System
Extra High Molecular Weight High Density Polyethylene
Bulletin No. 112

Pipe Data & Pressure Ratings Chart
Bulletin No. 301

Dimensions For Molded Fittings
Bulletin No. 320

Dimensions For Fabricated Fittings
Bulletin No. 321

BLUESTRIPE® HDPE Potable Water Piping System
Meets AWWA C-901 & C-906
Bulletin No. 351

Technical Advantages of HTPE
Bulletin No. 354

FM Manual
Factory Mutual Approved for Firewater Systems
Bulletin No. 365

BLUESTRIPE-FM™
NSF and FM Approved Systems for Combined Firewater/Potable Water Systems
Bulletin No. 370

Perforated Piping System
Bulletin No. 450

DCS™ Dual Containment System
Bulletin No. 610

Landfill Applications—Polyethylene Piping Systems
Bulletin No. 620

SPIROLITE® Product Literature

Chemical Resistance
Bulletin No. 905

Tanks
Bulletin No. 906

Renewing Sewers with SPIROLITE
Bulletin No. 907

Installation Guide
Bulletin No. 914

Manholes
Bulletin No. 915

Available Options to Connect SPIROLITE Pipe to Manholes
Technical Bulletin TB-101

Guidelines For Grout Encasement
Technical Bulletin TB-140

Rev. 1.96 - supersedes all previous issues

LANE

Lane Enterprises, Inc.
Lane Metal Products Division

377 CROOKED LANE • KING OF PRUSSIA, PA 19406 • (610) 272-4531 • FAX (610) 272-4295

September 6, 1996

Holbrook Plastic Pipe Supply, Inc.
361 Tate Street
Holbrook, NY 11741

Project : Ogden Remediation
Clarkstown Landfill
West Nyack, NY

Gentlemen:

This letter is to certify that the corrugated metal pipe, bands, and fittings to be furnished, by Lane Enterprises, Inc., on the above referenced project complies with the following specifications:

AASHTO: M-36 - Zinc Coated (Galvanized) Corrugated Steel and Underdrains

M-245 - Precoated Steel Culverts and Underdrains

M-246 - Precoated Steel Sheets for Culverts and Underdrains

Corrugated pipe shall be 2 2/3 x 1/2 inch corrugations and shall be 14 gage (.079).

Connecting bands shall be provided with 3/8 inch flat neoprene gaskets.

Type of material furnished is in accordance with the project specifications.

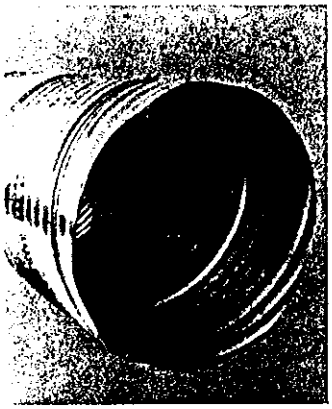
Very truly yours,

Lorraine Kenney
Sales Coordinator

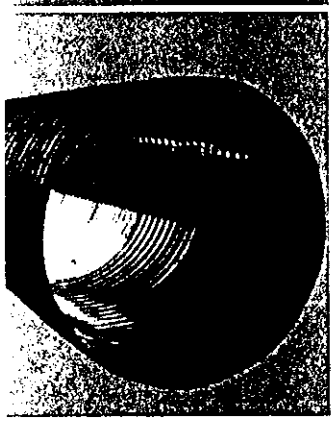
Lane corrugated steel pipe

12 through 54 in. diameter—use 2⅔ x ½ in. corrugation
60 through 120 in. diameter—use 5 x 1 in.* corrugation

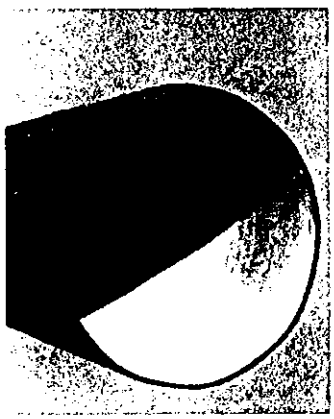
Plain Galvanized
Fabricated from ASTM A444 steel for maximum service life.



Fully Asphalt Coated
For installations where corrosive elements are present in the water or earth and where solids are waterborne.

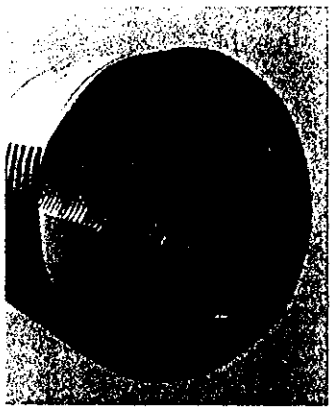


Smooth Interior
Sewer pipe with maximum flow capacity. The pipe has an interior coating of asphalt which completely fills the steel corrugations to provide a smooth cylindrical lining.

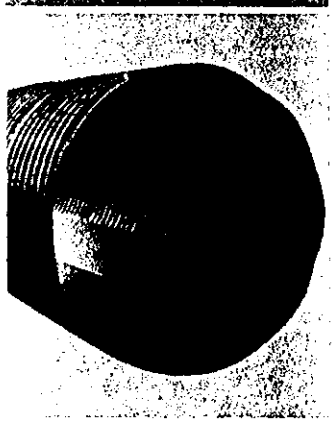


*Approximate size. Actual size is 125 x 25 mm.

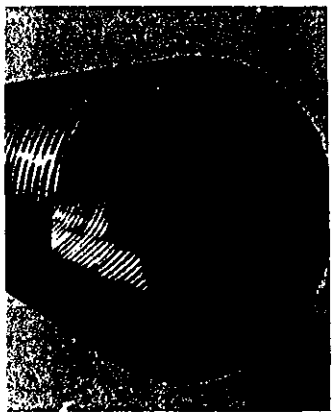
Half Asphalt Coated and Paved
Frequently used where corrosion or surface wearing elements are factors. Lower half (180 deg) of pipe is asphalt coated, and a smooth paving in the bottom quarter (90 deg) completely covers the corrugations.



Fully Asphalt Coated and Paved
Designed for use where corrosion and wear are unusually severe. The pipe is completely coated with asphalt, and is paved in the bottom quarter (90 deg).



Polymer Coated
Combats corrosion, abrasion, microbiological attack, and extreme acid conditions. For extreme abrasive conditions, asphalt paving over the polymer coating should be used. (Available in .052 through .109 in. thicknesses only.)



Lane pipe arches

Pipe arches are made from standard pipe sizes. All dimensions are measured from the inside crests of the corrugations. Sections are joined using standard corrugated connecting bands. Available: Plain galvanized • Fully asphalt coated • Fully asphalt coated with paved invert • Smooth interior • Polymer coated.

Height-of-cover limits for corrugated steel pipe arches H20, H25 and E80 live loads

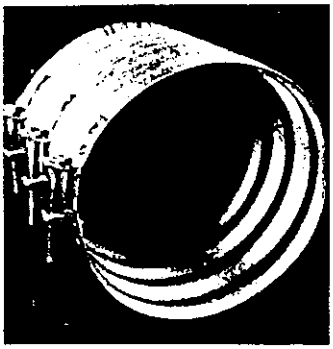
Corrugation	Sizes in Inches		Area Sq. Ft.	Minimum Specified Thickness Required in Inches	Minimum cover (in.)	Maximum Height-of-Fill Over Pipe Arch for the Following Corner Bearing Pressures in Tons per Sq. Ft.	
	Equiv. Pipe Diam.	Span x Rise				2 Tons	3 Tons
H20 Live Loads	15	17 x 13	1.1	0.064	12	16	
	18	21 x 15	1.6	0.064	12	15	
2⅔ x ½	21	24 x 18	2.2	0.064	12	15	
	24	28 x 20	2.9	0.064	12	15	
	30	35 x 24	4.5	0.064	12	15	
	36	42 x 29	6.5	0.064	12	15	
	42	49 x 33	8.9	0.079	12	15	
	48	57 x 38	11.6	0.109	12	15	
	54	64 x 43	14.7	0.109	12	15	
	60	71 x 47	18.1	0.138	12	15	
	66	77 x 52	21.9	0.168	12	15	
	72	83 x 57	26.0	0.168	12	15	
5 x 1	60	66 x 51	19.3	0.109**	12	25	
	66	73 x 55	23.2	0.109**	12	24	
	72	81 x 59	27.4	0.109	12	21	
	78	87 x 63	32.1	0.109	12	20	
	84	95 x 67	37.0	0.109	12	20	
	90	103 x 71	42.4	0.109	18	20	
	96	112 x 75	48.0	0.109	18	20	
	102	117 x 79	54.2	0.109	18	19	
	108	128 x 83	60.5	0.109	24	19	
	114	137 x 87	67.4	0.109	24	19	
	120	142 x 91	74.5	0.138	24	19	
E80 Live Loads	15	17 x 13	1.1	0.079	24		22
	18	21 x 15	1.6	0.079	24		22
2⅔ x ½	21	24 x 18	2.2	0.109	24		22
	24	28 x 20	2.9	0.109	24		22
	30	35 x 24	4.5	0.138	24		22
	36	42 x 29	6.5	0.138	24		22
	42	49 x 33	8.9	0.168	36		22
	48	57 x 38	11.6	0.168	36		22
	54	64 x 43	14.7	0.168	36		22
5 x 1	60	66 x 51	19.3	0.109**	24	25	
	66	73 x 55	23.2	0.109**	24	24	
	72	81 x 59	27.4	0.109	24	21	
	78	87 x 63	32.1	0.109	24	18	
	84	95 x 67	37.0	0.109	24	18	
	90	103 x 71	42.4	0.109	30	18	
	96	112 x 75	48.0	0.109	30	18	
	102	117 x 79	54.2	0.109	30	17	
	108	128 x 83	60.5	0.109	36	17	
	114	137 x 87	67.4	0.109	36	17	
	120	142 x 91	74.5	0.138	36	17	

Height-of-Cover Tables use the following values for the soil and steel parameters: Unit Weight of Soil - 120 lbs. per cu. ft.; Backfill compacted to AASHTO T-99 density of 90%; Yield point of Steel - 33,000 psi.

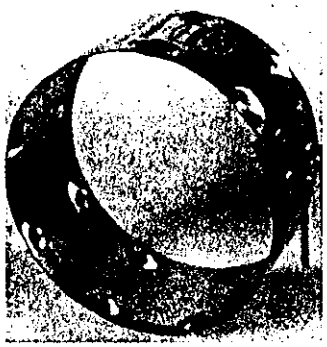
Pipe Arches are typically used where height of cover does not exceed 15 feet. Where height of cover is excessive, consideration should be given to using round pipe

**Thickness indicated due to manufacturing requirements.

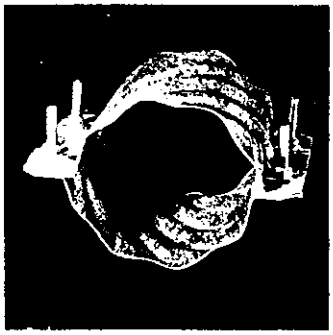
Lane connecting bands



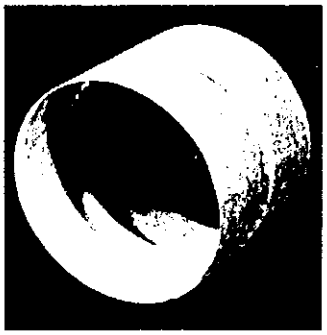
Annular



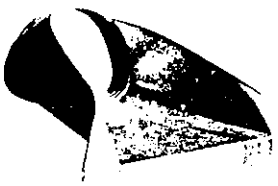
Universal Dimple



Two Piece Bolted



Sleeve



Helical or Annular Connections.

Steel End Sections

Culvert is completed with end sections for corrugated steel pipe or pipe-arches. Nothing else to order or install. Available in all standard pipe and pipe-arch sizes.

LANE

LANE ENTERPRISES, INC.
LANE METAL PRODUCTS DIVISION

New York

Ballston Spa (518) 885-4385
FAX (518) 885-0545
Bath (607) 776-3366
FAX (607) 776-3899

Pennsylvania

Bedford (814) 623-1191
FAX (814) 623-3495
Carlisle (717) 249-8342
FAX (717) 249-4991
King of Prussia (215) 272-4531
FAX (215) 272-4295
Pulaski (412) 652-7747
FAX (412) 652-0415

Virginia

Bealeton (703) 439-3201
FAX (703) 439-1042
Dublin (703) 674-4645
FAX (703) 674-0815

Lane's Corrugated Steel Pipe and Pipe Arches Meet the Following Specifications:

AASHTO:	M-36	ASTM:	444
	M-190		742
	M-218		760
	M-245		762
	M-274		796
	M-289		798
			849
			862

LANE

Polymeric Coated Pipe

HEIGHT-OF-COVER LIMITS FOR ROUND CORRUGATED STEEL PIPE

(H-20 OR H-25 LIVE LOAD)

2⅔" X ½" CORRUGATIONS

Diameter or Span in Inches	Min.* Cover In.	Maximum Cover in Feet Specified Thickness in Inches		
		.064	.079	.109
12	12	248	310	
15		199	248	
18		166	207	
21		142	178	249
24		124	155	218
27		111	138	193
30		99	124	174
36		83	103	145
42		71	88	124
48		62	77	109
54			66	93
60				79
66	12			68

*From top of pipe to bottom of flexible pavement or top of rigid pavement.

5" X 1" OR 3" X 1"

Diameter or Span in Inches	Min.* Cover	Maximum Cover in Feet** Specified Thickness in Inches		
		.064	.079	.109
54	12	56	70	98
60		50	63	88
66		46	57	80
72		42	52	73
78		39	48	68
84		36	45	63
90		33	42	59
96	12	31	39	55
102	18	29	37	52
108			35	49
114			32	45
120	18		30	41

*From top of pipe to bottom of flexible pavement or top of rigid pavement

**Maximum covers shown are for 5" X 1" Increase them 13% for 3" x 1"

HEIGHT-OF-COVER LIMITS FOR ARCH CORRUGATED STEEL PIPE

(H-20 OR H-25 LIVE LOAD)

2⅔" X ½" CORRUGATIONS

Span & Rise	Minimum Specified Thickness Required	Maximum Depth of Cover (feet) Over Pipe-Arch for Soil Bearing Capacities in Tons/Ft.²			Minimum** Cover
(inches)	(inch)	2	3	4	(inches)
17 X 13	0.064	16	24	32	18
21 X 15	0.064	15	22	30	18
24 X 18	0.064	15	22	30	18
28 X 20	0.064	15	22	30	18
35 X 24	0.064	15	22	30	18
42 X 29	0.064	15	22	30	18
49 X 33	0.079	15	22	30	18
57 X 38	0.109	15	22	30	18
64 X 43	0.109	15	22	30	18
71 X 47	0.138	15	22	30	18
77 X 52	0.168	15	22	30	18
83 X 57	0.168	15	22	30	18

*For H25 loading and 2 tons/Ft.² bearing capacity, minimum cover is 24 in. for all sizes.

Notes. 1. Soil bearing capacity refers to the soil in the region of the pipe corners. The remaining backfill around the pipe-arch must be compacted to a specified AASHTO T-99 density of 90%.

2. Use reasonable care in handling and installation.

**From top of pipe to bottom of flexible pavement or top of rigid pavement.

5" X 1" AND 3" X 1" CORRUGATIONS

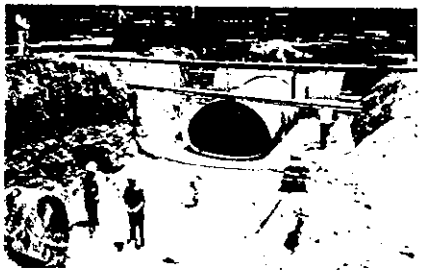
Span & Rise	Minimum Specified Thickness Required		Minimum** Cover	Maximum Depth of Cover (feet) Over Pipe-Arch for Soil Bearing Capacities in Tons/Ft.²		
	3 X 1	5 X 1				
(inches)	(inch)	(inch)	(inches)	2	3	4
53 X 41	0.079	–	12	25	37	50
60 X 46	0.079	–	12	25	37	49
66 X 51	0.079	–	12	25	37	49
73 X 55	0.079	–	12	24	36	48
81 X 59	0.079	0.109	12*	21	31	41
87 X 63	0.079	0.109	12*	20	30	40
95 X 67	0.079	0.1009	12*	20	30	40
103 X 71	0.079	0.109	18	20	30	40
112 X 75	0.079	0.109	18	20	29	39
117 X 79	0.109	0.109	18	19	29	38
128 X 83	0.109	0.109	24	19	29	38
137 X 87	0.109	0.109	24	19	28	38
142 X 91	0.138	0.138	24	19	28	38

*For H25 loading and 2 ton/Ft.² bearing capacity, minimum cover is 18 in. for these three sizes

Notes. 1. Soil bearing capacity refers to the soil in the region of the pipe corners. The remaining backfill around the pipe-arch must be compacted to a specified AASHTO T-99 density of 90%.

2. Use reasonable care in handling and installation.

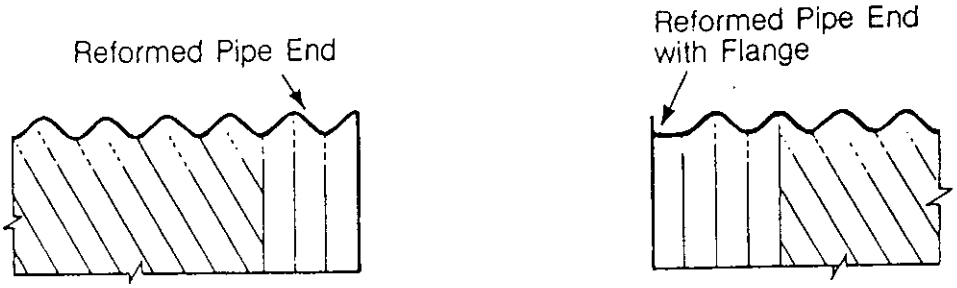
**From top of pipe to bottom of flexible pavement or top of rigid pavement.



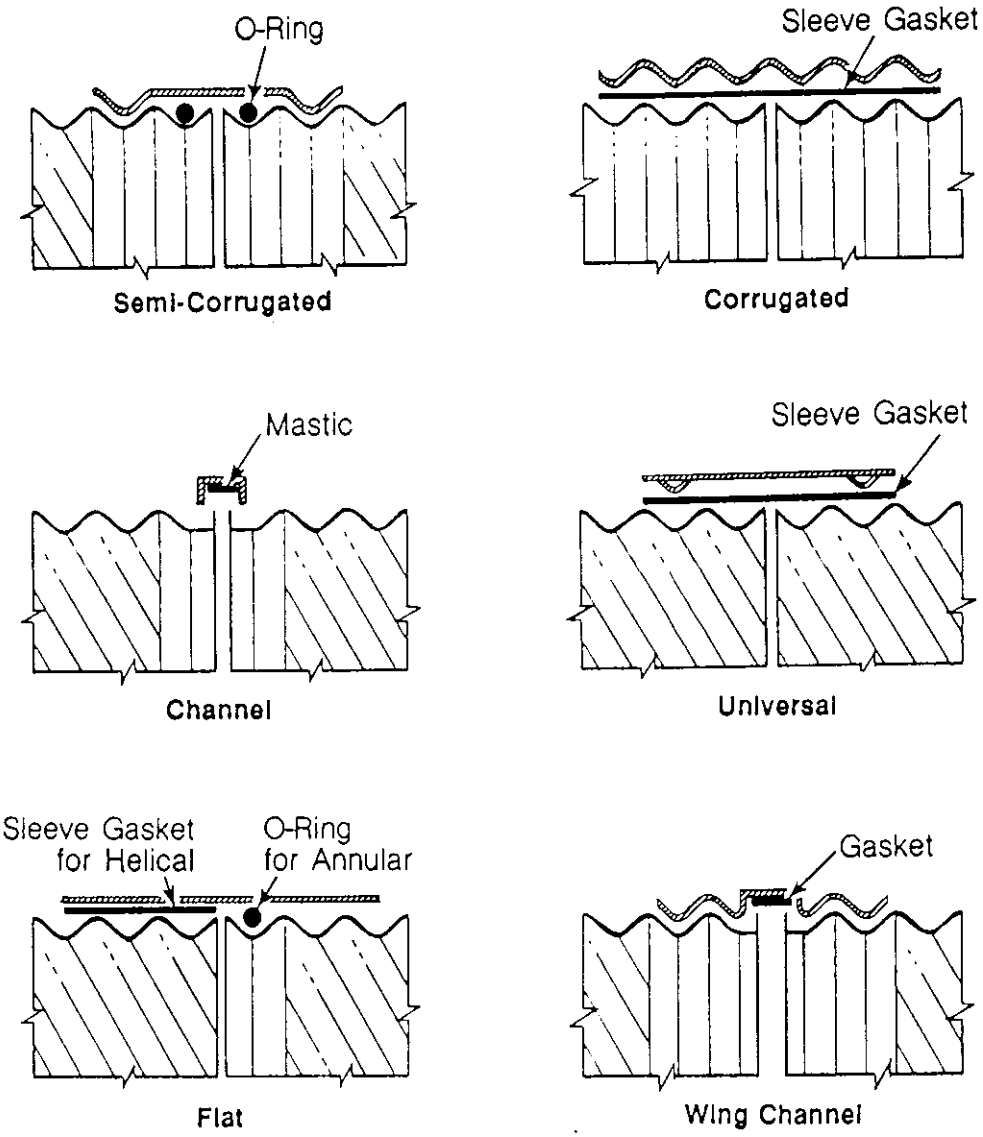
Lane polymer-coated pipe is adaptable to a variety of fittings and skewing requirements

In erosive conditions, polymeric pipe accommodates pavement in the invert.

Polymeric pipe is truck-loaded for shipment along with Lane galvanized pipe.



Standard CSP Band Types



When gaskets are required, they are placed as shown.

OGDEN Remediation Services Co., Inc.

Letter of Transmittal # 57

TO Roy F. Weston of New York, Inc.
Sutton park, Suite 205
465 Columbus Avenue
Vallhalla, NY 10595-1336
(914) 747-5010/5020 (fax)

Date: 10/7/96	**ORSC Project No. 60010 0000 0050 8000**
Attention: John Woodley	
Re: Remediation of Clarkstown Sanitary LF & LF Capping	
Town of Clarkstown, Rockland County, New York	
Ogden Remediation Services Co., Inc. (ORSC)	
Submittal Item #: 132	
Subcontractor/Supplier: The Fort Miller Co., Inc.	

We Are Sending You (by hand):

[X] Attached [ ] Prints [ ] Under separate cover via _____ the following items:
[X] Shop drawings [ ] Change order [ ] Plans [ ] Samples [ ] Specifications
[ ] Copy of letter [ ] Reviewed & Approved [ ] _____

COPIES	DATE	NO.	DESCRIPTION
4	10/1/96	3	Precast Concrete Headwalls - Types A, B, & C
			App. Spec. Section #: 03400, 1.03, A.-D.
			(Precast Concrete)

These are transmitted as checked below:

[X] For approval [ ] Approved as submitted [ ] Resubmit ____ copies for approval
[ ] For your use [ ] Approved as noted [ ] Submit ____ copies for distribution
[ ] As requested [ ] Returned for corrections [ ] Return ____ corrected prints
[ ] For review and comment [X] **Please Respond by 10/22/96**
[ ] For Bids Due on [ ] For Record Purposes [ ] Prints Returned After Loan to Us

Remarks: Tim/John:

Please inform ORSC at your earliest convenience to facilitate ordering this prefabricated item.

This submittal consists of 3-plan size sheets. Are we including the plan size sheets or are we referencing the submittal?

Copies To: CDS/TL/KK, RFW w/attachment
FF.SI132 w/att.; CF.PM, ORSC w/attach.

Signed: Dean D. LaFleur
Dean D. LaFleur/Site Engineer/QCSM

Ogden Remediation Services Co., Inc. (ORSC)
166 Route 303
W. Nyack, NY 10994
(914) 358-2720 (EST)
(914) 358-2790 (fax)

APPENDIX I4:

Granular Drainage System Aggregates Data

GRANULAR DRAINAGE
(COVER SYSTEM DRAINAGE AGGREGATE)

TILCON NEW YORK INC. P.O. Box 362 Haverstraw, NY 10927 914 638 1300

Cert. of Compliance

September 17, 1996

Granular Drainage Aggregate
Bid Item #6A
(5,100 CY)

Dean La Fleur
Ogden Remediation Services
285 Davidson Ave
Somerset, NJ 08873

Re: Clarkstown Landfill Project

Dear Sir:

The Tilcon New York Inc. Haverstraw quarry is a New York State D.O.T. approved material source. Enclosed please find source approval. The source number is 8-10R and the test number is 95AR9.

Also enclosed are proctors for Tomkins Cove and Haverstraw Pond dredgings and of the NYS #3, NYS # 1's & 2's, ASTM #8's and subbase 304.05 NYS Item 4, produced at the Haverstraw plant.

The Fine & Light Stone Fill items produced at the Haverstraw plant conform to the following:

	Stone Size	% of Total by Weight
Fine Stone Fill		
	Smaller than 8ins	90-100
	Larger than 3ins.	50-100
	Smaller than # 10 Sieve	0-10
Light Stone Fill		
	Lighter than 100lbs	90-100
	Larger than 6ins.	50-100
	Smaller than 1/2"	0- 10

If you have any questions, please call me.

Sincerely,

TILCON NEW YORK INC.

Morsia Thomas

Morsia Thomas
Director, Quality Control

STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
4 BURNETT BOULEVARD
POUGHKEEPSIE, N.Y. 12603

ALBERT J. BAUMAN
REGIONAL DIRECTOR

JOHN B. DALY
COMMISSIONER

July 20, 1995

Tilcon New York, Inc.
P. O. Box 362
Haverstraw, NY 10927

RE: TEST # 95AR9
SOURCE # 8-10 R
TOWN OF Haverstraw
COUNTY OF Rockland
USGS LOCATION 214-1-M-28

Gentlemen:

Material as represented by this sample described above was accepted on 95/06/08 for Item 703-02 (coarse aggregate)..

TEST DATA:

Specific Gravity	2.86
Absorption	0.9
Finess Modulus	-

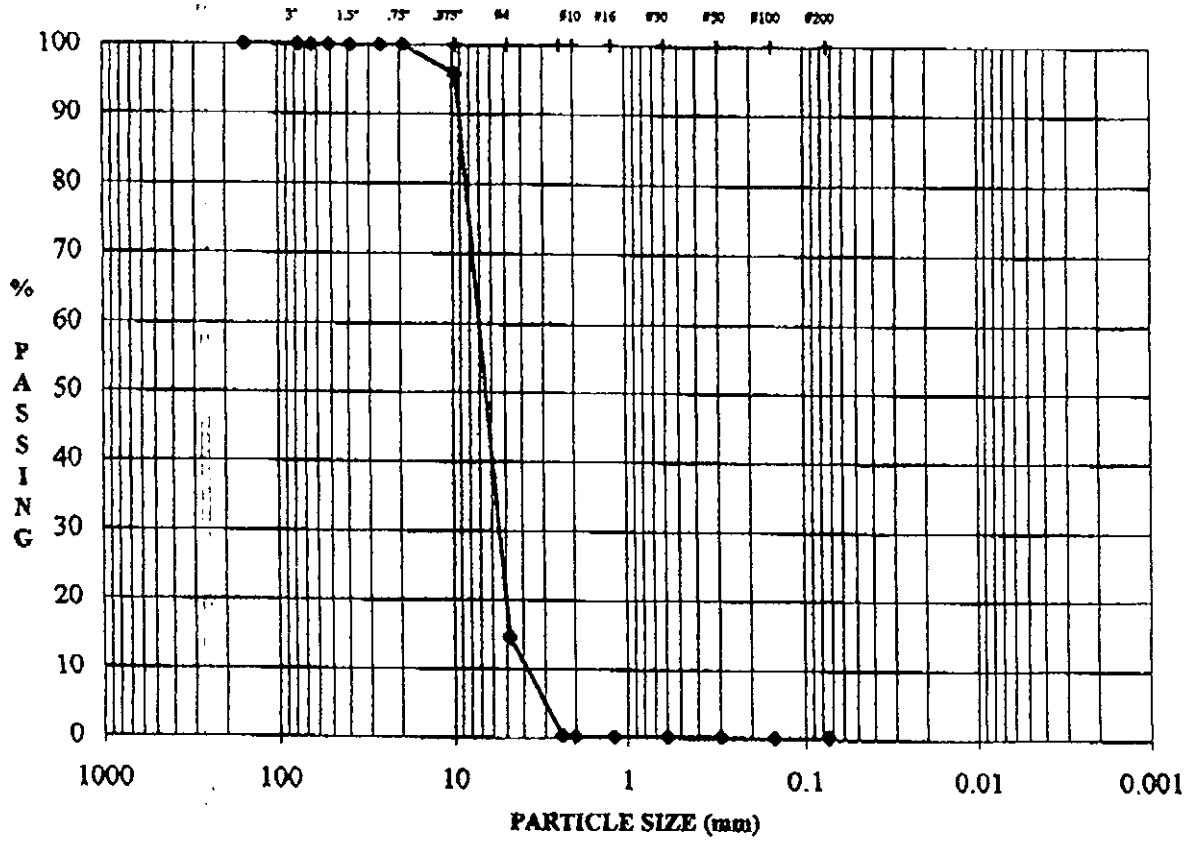
Very truly yours,

M. P. ANDERSON
Regional Construction Engineer

By L. M. Ackerman
L. M. Ackerman
Regional Materials Engineer

LMA:FMC:SMD

PARTICLE-SIZE DISTRIBUTION ASTM C 136
US STANDARD SIEVE OPENING SIZES



COBBLES	GRAVEL	SAND	Silt or Clay Size FINES

SAMPLE #:	6A
DESCRIPTION:	Gray c GRAVEL, some sand, trace fines

Mc:	1.14%
LL:	-
PL:	-
PI :	-
Gs:	-

OGDEN/CLARKSTOWN LF/NY

DATE	09/20/96
TECH	RDD
REVIEW	RMW

GOLDER ASSOCIATES INC.
MT. LAUREL, NEW JERSEY

PERMEABILITY OF GRANULAR SOILS (CONSTANT HEAD)
ASTM D 2434

OGDEN/CLARKSTOWN LF/NY	SAMPLE #: 6A

SAMPLE DATA:

Desired density (pcf)	101.21
Weight soil (g)	6000
% Moisture	0.00%
Height, soil (in)	8.16
Height, inflow (in)	57.60
Height, outflow (in)	54.84
Head (in)	2.76
Gradient	0.34
Diameter (in)	6.00
Area (in^2)	28.27
* Volume (in^3)	225.36
Density, wet (pcf)	101.38
Density, dry (pcf)	101.38

PERMEABILITY DATA:

Trials	Time (sec)	Flow (cc)
1	1.15	100.00
2	1.12	100.00
3	1.19	100.00
4	1.14	100.00
5	1.19	100.00
Average	1.16	100.00
Temp, water (C)		21.00
Temp, corrected		0.976

Flow per unit time (cc/sec)	86.36
Calculation coefficient	1.6E-02
Hydraulic Conductivity (cm/sec)	**1.4E+00**

* Volume corrected for apparatus construction.

FINES LOST,TEST:

tare #	BT-9
wt soil&tare, before test	6348.00
wt soil&tare, after test	6328.00
wt tare	348.00
wt fines lost	20.00
wt dry soil	6000.00
% fines lost	0.33%

DATE	09/23/96
TECH	JMP
REVIEW	RMW

GOLDER ASSOCIATES INC.

MT. LAUREL, NEW JERSEY

RECEIVED OCT 08

Golder Associates Inc.

305 Fellowship Road, Suite 200
Mt. Laurel, NJ USA 08054
Tel: (609) 273-1110
Fax (609) 273-0778

Golder Associates

FACSIMILE TRANSMISSION

DATE TRANSMITTED: 10/08/96

TO: Dean D. LaFleur

FAX NO: (914) 358-2790

FROM: Bob Wilkinson RJW

SUBJECT: 6A & 6B lab data

Carb. Content
ASTM D 4373

TOTAL NUMBER OF PAGES (including this cover): 1

Dean,

★ Received a telephone call from BS&T and was given verbal results for % lost for samples 6A & 6B:

6A = 4.6 % lost
6B = 6.5 % lost ★ — Granular Dr. System Agg.

Was told that fax copies will follow as soon as possible.

If you have questions, please contact me at (609) 722-9060.

PLEASE MARK TIME AFTER TRANSMISSION:

Sent at ____ am/pm
By _____

If any problems occur with reception of the fax transmission, please contact the operator at 609-722-9060.

Clarkstown Landfill Remediation
Laboratory Services Request
#LL-2339-K3

For:
Mr. Reddy Kancharla
M & T/Namow/TCL
47 Hudson Street
Ossining, N.Y. 10562
PH (914)762-9000
FX (914)762-9638

From:
Roy F. Weston of New York
Clarkstown Field Office
166 Rte. 303
West Nyack, N.Y. 10994
PH (914)353-5221
FX (914)353-5491

Sample I.D.	Source	Misc	ASTM D422	ASTM 2974	ASTM D4972	EPA 8020									Remarks
TS08RZ	Sam Braen		X	X	X	X									Retest of Failed test *
CSDA-01			X												
PDA-01			X												
			* Sample split with Ogden to confirm organic content. Please perform organic content + Grainsize then call Bruce LaPenta @ (732) 417-5869 for instructions.												

Received By: IRIC

Date/Time: 12/7

Delivered By:

Results Required, Date/Time:

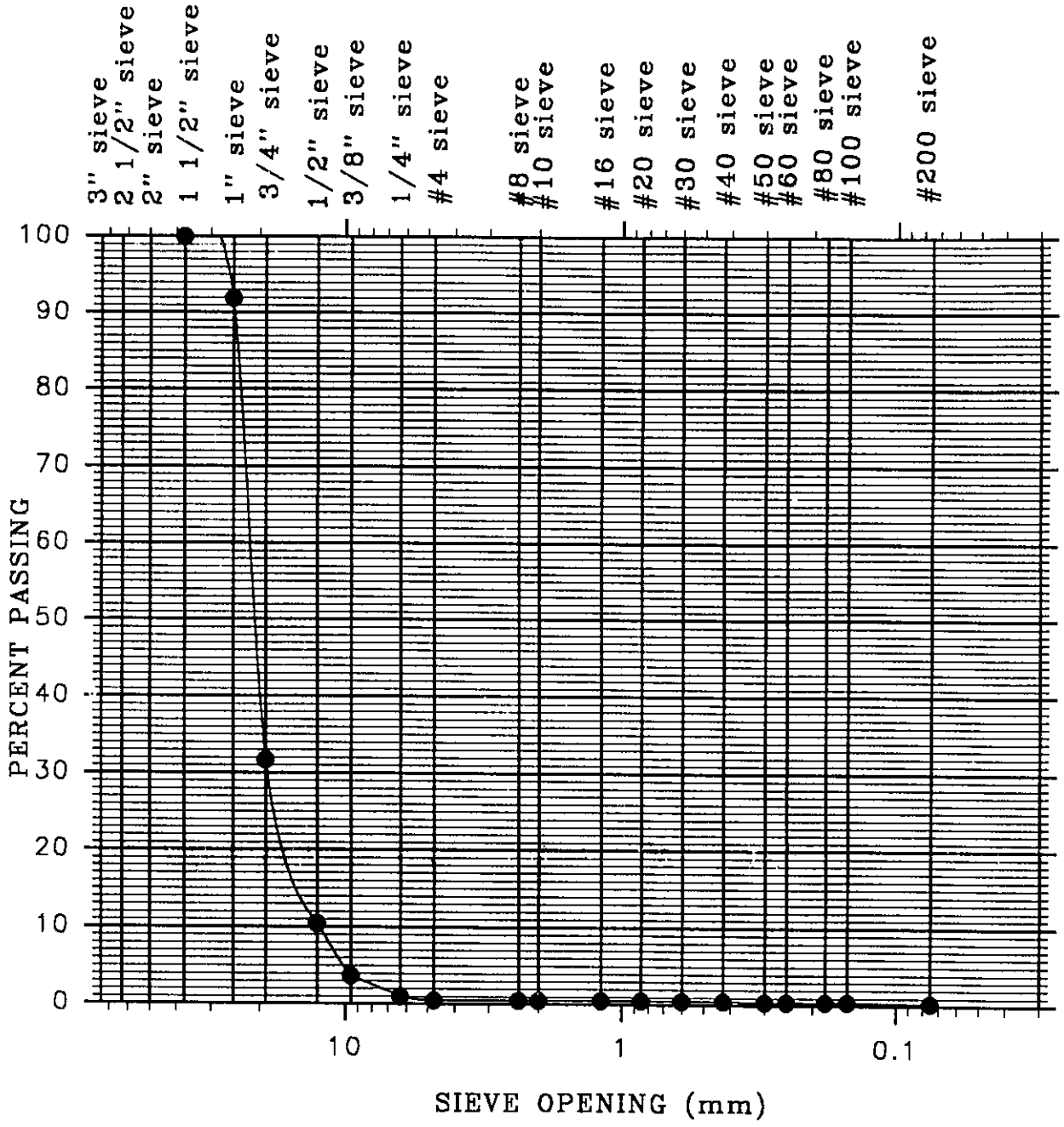


Figure 1: Particle Size Gradation Curve of Soil No. CSDA-01

OGDEN REMEDIATION SERVICES CO., INC.

Soil Sample Test Request Record

Project Name/Client: Clarkstown Landfill / LE Capping   Project No.: [illegible]   Date Sent: 12/18/98

Project Location: West Nyack N.Y.   Purchase Order No.: ______   Shipped Via: ______

Sampled By: (Signature) Michael [illegible]   Lab Contact: ______   Date Received: ______

[illegible] 12-21-98

Sample No.	Description	Standard Proctor ASTM D698	Modified Proctor ASTM D1557	Atterberg Limits ASTM D4318	Sieve Analysis ASTM D422	Hydrometer ASTM D1140	Moisture Content ASTM D2216	Classification ASTM D2487	Remolded Perm.	Falling Head Perm.	Flex. Wall Perm.	Hydraulic Conduct. D2434	D422 C117/136 Sieve w/ hydr.	
CSDA-1	Cover System Drainage agregate											X	X	
CSDA-2														
CSDA-3														
CSDA-4														
CSDA-5														
CSDA-6														
CSDA-7														

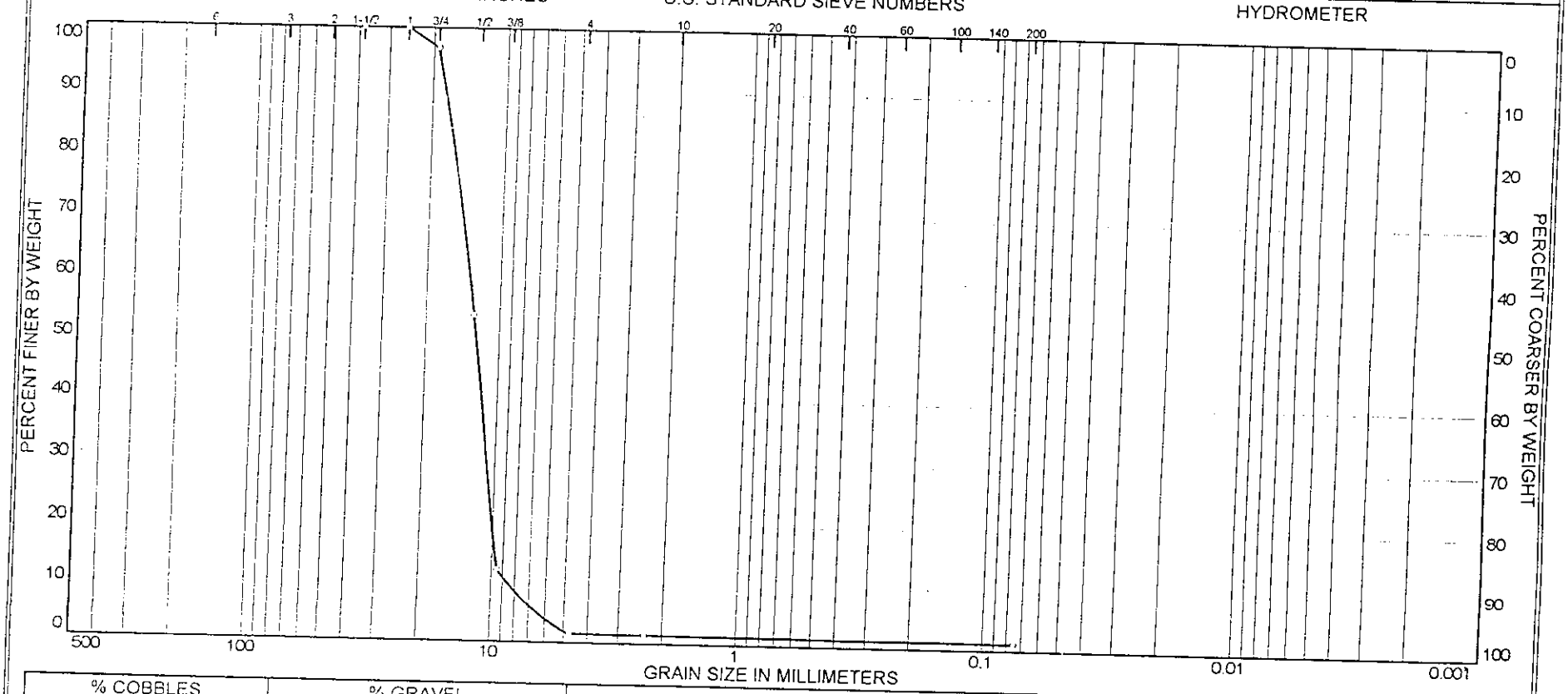
Comments/Special Instructions:
CSDA-1 Sampled at GE-43
CSDA-2 mid-drain, S.E. of sed. basin 5
CSDA-3 Sampled at GE-32
GSDA-4 Sampled S. of Riser 50
GSDA-5 Sampled at Collection Chamber #6
GSDA-6 Sampled at GE-19
GSDA-7 Sampled at GE-51

White Copy - Lab   Yellow Copy - File   Pink Copy - Attach to Daily Report

F200CR3

Rev. 4/93

PARTICLE SIZE DISTRIBUTION TEST REPORT



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	98.5	0.3	1.2	

SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
	CSDA-2		12-18-98					

Client Ogden Remediation Services

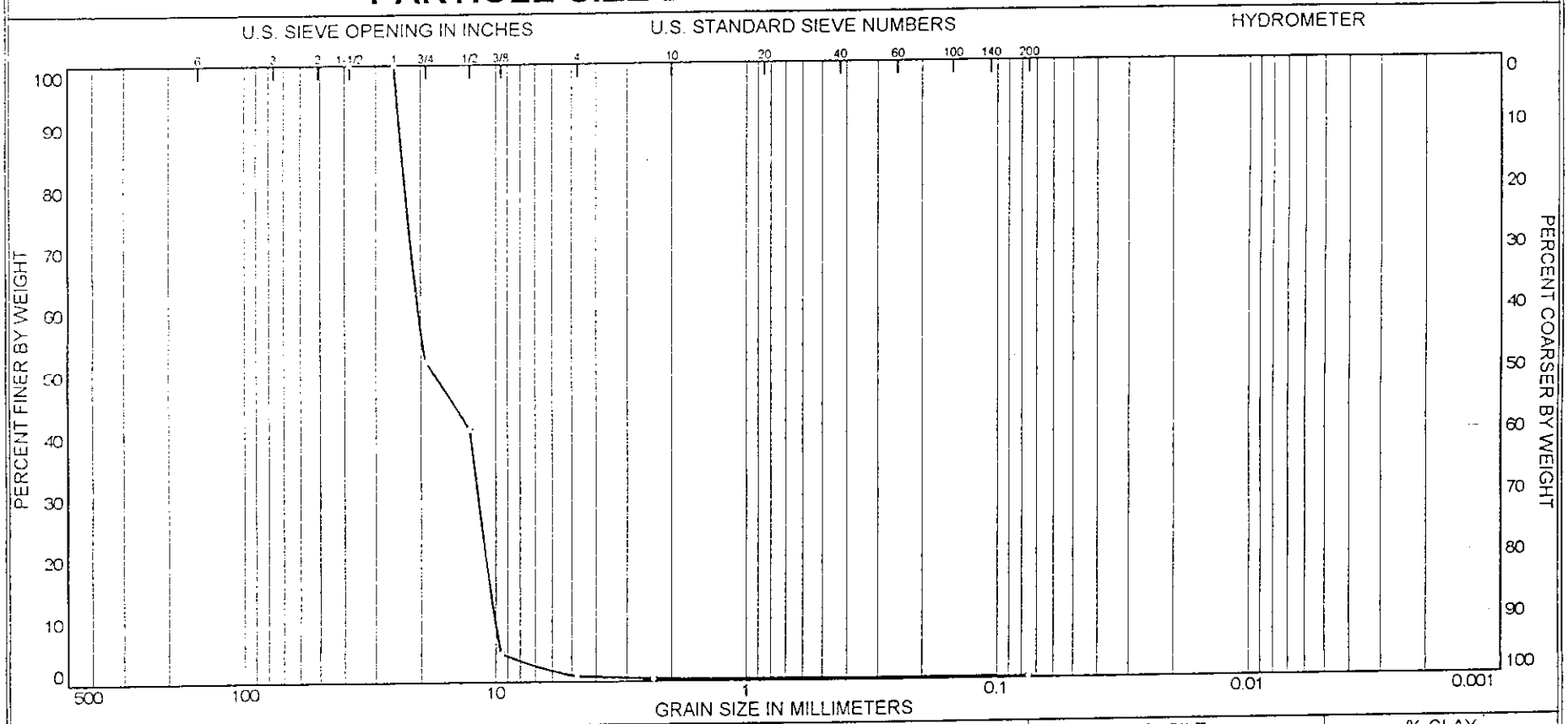
Project Clarkstown Landfill

Project No. | Plate

FAIRWAY TESTING CO., INC.

○ Permeability (D2434) k=0.75 cm/sec @ 105.2 pcf dry density

PARTICLE SIZE DISTRIBUTION TEST REPORT



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	99.1	0.7	0.2	

SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
	CSDA-4		12-18-98					

Client Ogden Remediation Services

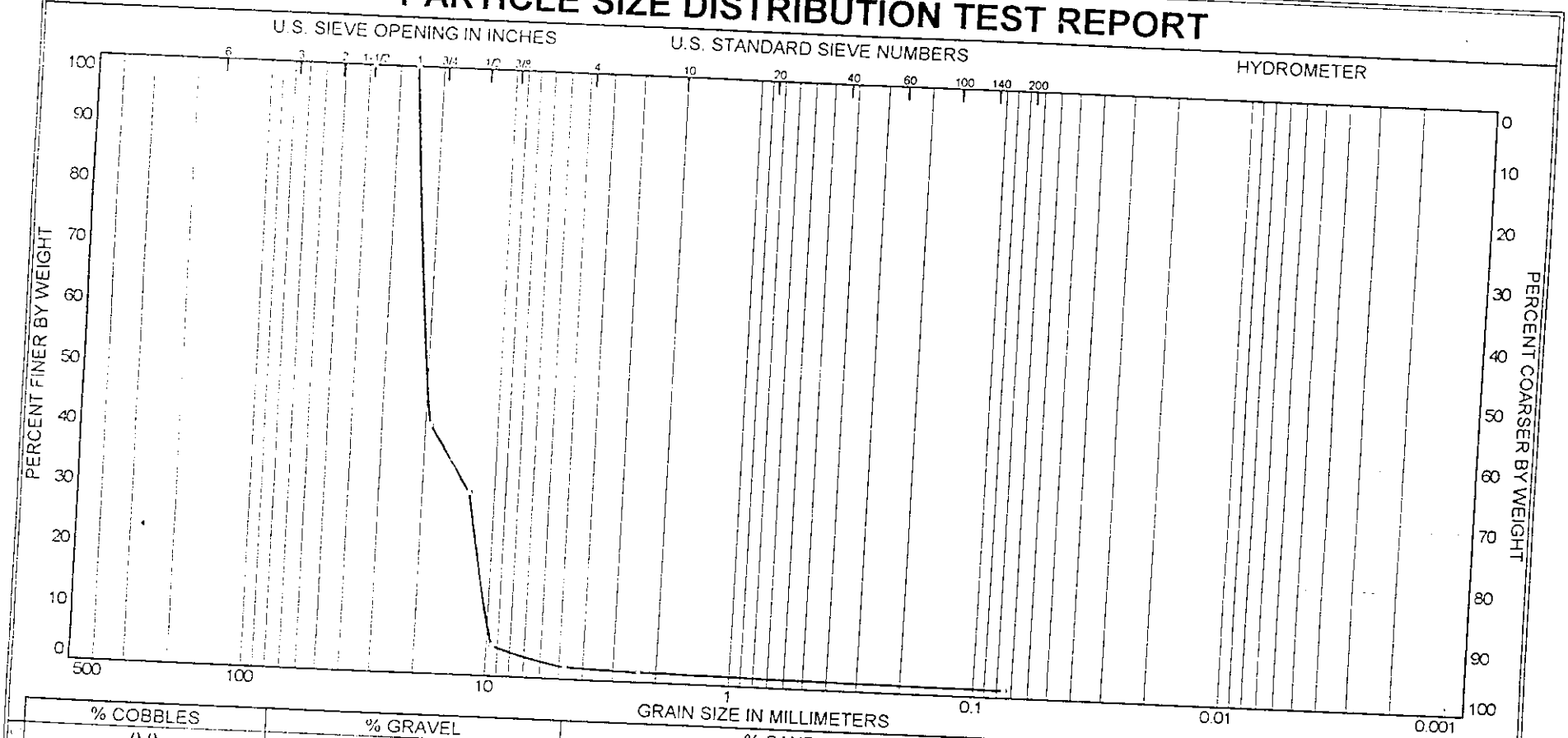
Project Clarkstown Landfill

Project No. | Plate

FAIRWAY TESTING CO., INC.

○ Permeability (D2434): k=0.46 cm/sec @ 101.2 pcf dry density

PARTICLE SIZE DISTRIBUTION TEST REPORT



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	98.0	0.8	1.2	

SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
	CSDA-6		12-18-98					

Client Ogden Remediation Services

Project Clarkstown Landfill

Project No. Plate

FAIRWAY TESTING CO., INC.

Permeability (D2434): k=0.57 cm/sec @ 103.4 pcf dry density

PERIMETER DRAINAGE

TILCON NEW YORK INC. P.O. Box 362 Haverstraw, NY 10927 914 638 1300

Certificate of Compliance

September 17, 1996

Perimeter Drainage Aggregate (PDA)
Bid Item # 6B
(3,800 LF)

Dean La Fleur
Ogden Remediation Services
285 Davidson Ave
Somerset, NJ 08873

Re: Clarkstown Landfill Project

Dear Sir:

The Tilcon New York Inc. Haverstraw quarry is a New York State D.O.T. approved material source. Enclosed please find source approval. The source number is 8-10R and the test number is 95AR9.

Also enclosed are proctors for Tomkins Cove and Haverstraw Pond dredgings and of the NYS #3, NYS # 1's & 2's, ASTM #8's and subbase 304.05 NYS Item 4, produced at the Haverstraw plant.

The Fine & Light Stone Fill items produced at the Haverstraw plant conform to the following:

		% of Total by Weight
Fine Stone Fill	Stone Size	
	Smaller than 8ins	90-100
	Larger than 3ins.	50-100
	Smaller than # 10 Sieve	0-10
Light Stone Fill		
	Lighter than 100lbs	90-100
	Larger than 6ins.	50-100
	Smaller than 1/2"	0- 10

If you have any questions, please call me.

Sincerely,

TILCON NEW YORK INC.

Morsia Thomas

Morsia Thomas
Director, Quality Control

STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
4 BURNETT BOULEVARD
POUGHKEEPSIE, N.Y. 12603

ALBERT J. BAUMAN
REGIONAL DIRECTOR

JOHN B. DALY
COMMISSIONER

July 20, 1995

Tilcon New York, Inc.
P. O. Box 362
Haverstraw, NY 10927

RE: TEST # 95AR9
SOURCE # 8-10 R
TOWN OF Haverstraw
COUNTY OF Rockland
USGS LOCATION 214-1-M-28

Gentlemen:

Material as represented by this sample described above was accepted on 95/06/08 for Item 703-02 (coarse aggregate)..

TEST DATA:

Specific Gravity	2.86
Absorption	0.9
Finess Modulus	-

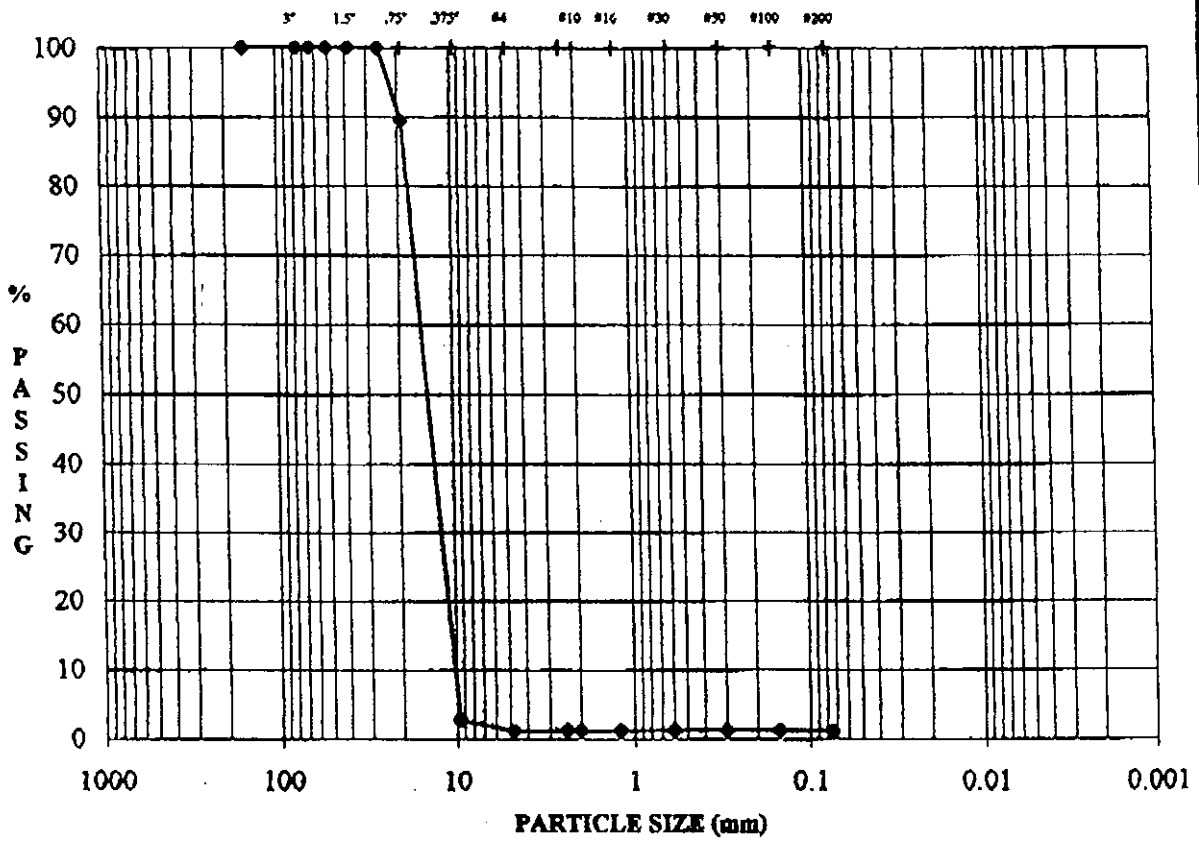
Very truly yours,

M. P. ANDERSON
Regional Construction Engineer

By L. M. Ackerman
L. M. Ackerman
Regional Materials Engineer

LMA:FMC:SMD

PARTICLE-SIZE DISTRIBUTION ASTM C 136
US STANDARD SIEVE OPENING SIZES



COBBLES	GRAVEL	SAND	Silt or Clay Size FINES

SAMPLE #:	6B
DESCRIPTION:	Gray c GRAVEL, trace fines, trace sand

Mc:	0.86%
LL:	-
PL:	-
PI:	-
Gs:	-

OGDEN/CLARKSTOWN LF/NY

DATE	09/20/96
TECH	RDD
REVIEW	RMW

GOLDER ASSOCIATES INC.
MT. LAUREL, NEW JERSEY

PERMEABILITY OF GRANULAR SOILS (CONSTANT HEAD)
ASTM D 2434

OGDEN/CLARKSTOWN LF/NY	SAMPLE #: 6B

SAMPLE DATA:

Desired density (pcf)	103.11
Weight soil (g)	8000
% Moisture	0.00%
Height, soil (in)	4.08
Height, inflow (in)	57.60
Height, outflow (in)	56.76
Head (in)	0.84
Gradient	0.21
Diameter (in)	10.00
Area (in^2)	78.54
* Volume (in^3)	297.98
Density, wet (pcf)	102.23
Density, dry (pcf)	102.23

PERMEABILITY DATA:

Trials	Time (sec)	Flow (cc)
1	4.42	100.00
2	4.45	100.00
3	4.42	100.00
4	4.47	100.00
5	4.41	100.00
Average	4.43	100.00

Temp, water (C)	22.00
Temp, corrected	0.953
Flow per unit time (cc/sec)	22.55
Calculation coefficient	9.1E-03
Hydraulic Conductivity (cm/sec)	**2.1E-01**

* Volume corrected for apparatus construction.

FINES LOST,TEST:

tare #	Z-10
wt soil&tare, before test	8349.00
wt soil&tare, after test	8340.00
wt tare	349.00
wt fines lost	9.00
wt dry soil	8000.00
% fines lost	0.11%

DATE	09/23/96
TECH	JMP
REVIEW	RMW

GOLDER ASSOCIATES INC.

MT. LAUREL, NEW JERSEY

RECEIVED OCT 08 '96

Golder Associates Inc.

305 Fellowship Road, Suite 200
Mt. Laurel, NJ USA 08054
Tel: (609) 273-1110
Fax (609) 273-0778

Golder Associates

FACSIMILE TRANSMISSION

DATE TRANSMITTED: 10/08/96

TO: Dean D. LaFleur

FAX NO: (914) 358-2790

FROM: Bob Wilkinson RJW

SUBJECT: 6A & 6B lab data

Carb. Content
ASTM D4373

TOTAL NUMBER OF PAGES (including this cover): 1

Dean,

Received a telephone call from BS&T and was given verbal results for % lost for samples 6A & 6B:

6A = 4.6 % lost
6B = 6.5 % lost — Perimeter Dr. System Agg.

Was told that fax copies will follow as soon as possible.

If you have questions, please contact me at (609) 722-9060.

PLEASE MARK TIME AFTER TRANSMISSION:

Sent at _____ am/pm
By _____

If any problems occur with reception of the fax transmission, please contact the operator at 609-722-9060.

Clarkstown Landfill Remediation
Laboratory Services Request
#LL-2339-K3

For:
Mr. Reddy Kancharla
M & T/Namow/TCL
47 Hudson Street
Ossining, N.Y. 10562
PH (914)762-9000
FX (914)762-9638

From:
Roy F. Weston of New York
Clarkstown Field Office
166 Rte. 303
West Nyack, N.Y. 10994
PH (914)353-5221
FX (914)353-5491

Sample I.D.	Source	Misc	ASTM D422	ASTM 2974	ASTM D4972	ETH 8020									Remarks
TS-08RZ	Sam Braen		X	X	X	X									Retest of Failed Test *
CSDA-01			X												
PDA-01			X												
			* Sample split with Ogden to												
			confirm organic content. Please												
			perform organic content + Grainsize												
			then call Bruce LaPerle @												
			(732) 417-5869 for instructions.												

Received By: VRC

Date/Time: 12/7

Delivered By:

Results Required, Date/Time:

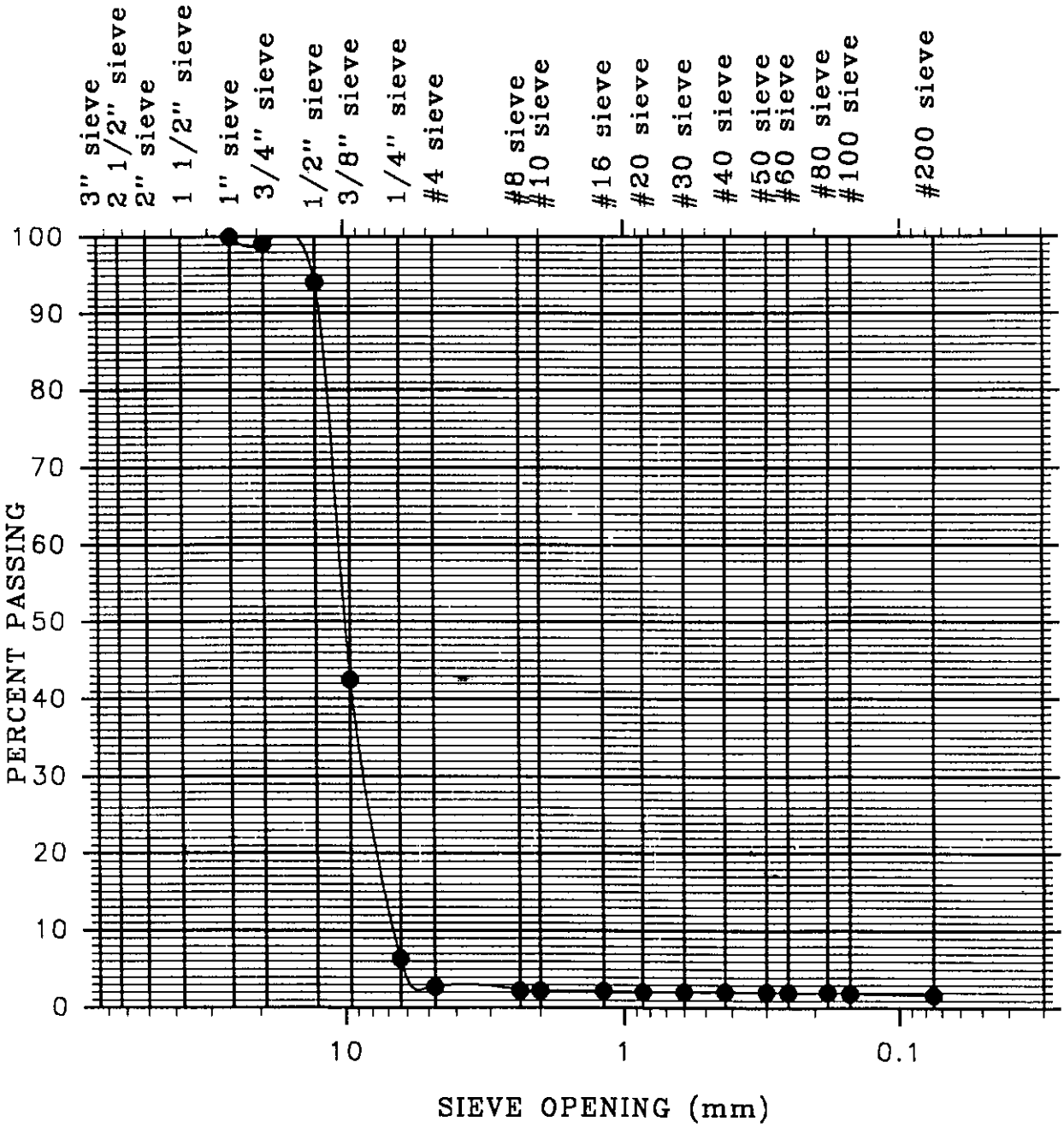


Figure 1: Particle Size Gradation Curve of Soil No. PDA-01

OGDEN ENVIRONMENTAL SERVICES CO., INC.

Project Name/Client: [illegible] Project No.: [illegible] Date Sent: 12/18/98

Project Location: West Nyack N.Y. Purchase Order No.: ______ Shipped Via: ______

Sampled By: (Signature) [illegible] Lab Contact: ______ Date Received: ______

Sample No.	Description	Standard Proctor ASTM D698	Modified Proctor ASTM D1557	Atterberg Limits ASTM D4318	Sieve Analysis ASTM D422	Hydrometer ASTM D1140	Moisture Content ASTM D2216	Classification ASTM D2487	Remolded Perm.	Falling Head Perm.	Flex. Wall. Perm.	Hydraulic Condc D2434	D422, C117/136 Sieve w/ hydr.	
PDA-1	Perimeter Drainage Aggregate											X	X	
PDA-2	↓											X	X	

(ANALYSIS REQUIRED spans the test columns)

Handwritten margin note: per Mike D… 12-21-98

Comments/Special Instructions: PDA - 1 Sampled at sediment basin 3

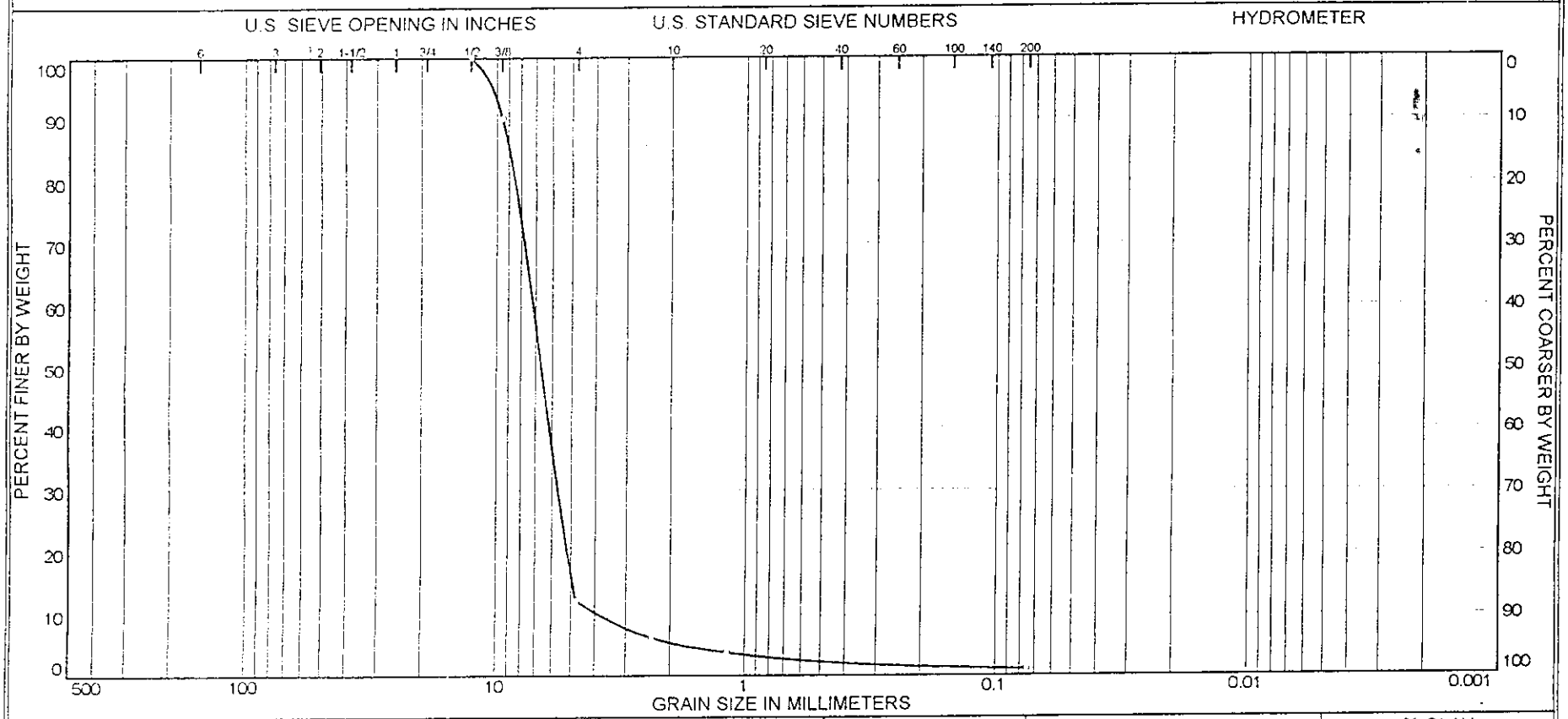
PDA - 2 Sampled from on-site stockpile

White Copy - Lab Yellow Copy - File Pink Copy - Attach to Daily Report

FZGCR5

Rev. 4/93

PARTICLE SIZE DISTRIBUTION TEST REPORT



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	87.6	11.4	1.0	

SOURCE	SAMPLE #	DEPTH/ELEV.	DATE SAMPLED	USCS	MATERIAL DESCRIPTION	NM %	LL	PL
	PDA-2		12-18-98					

Client Ogden Remediation Services

Project Clarkstown Landfill

Project No. | Plate

FAIRWAY TESTING CO., INC.

(1) Permeability (D2434): k=0.34 cm/sec @ 104.5 pcf dry density