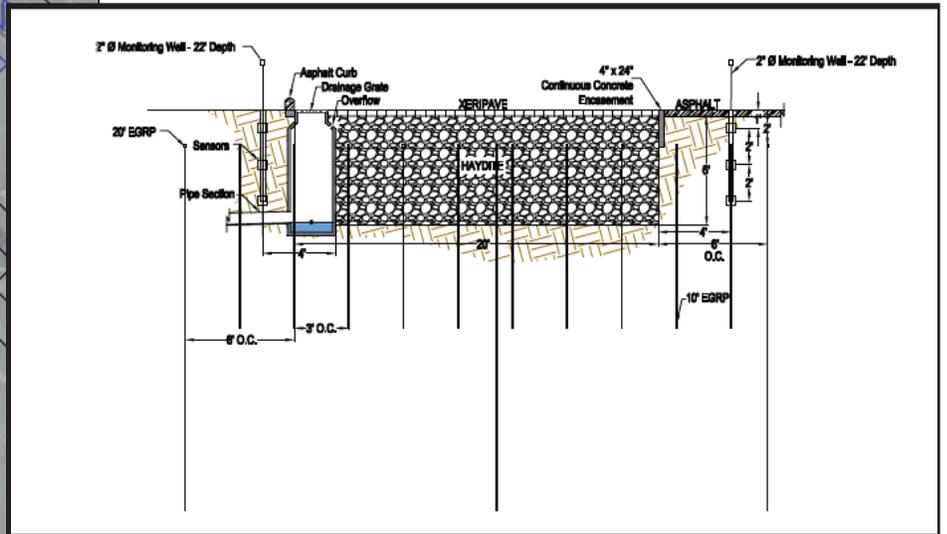
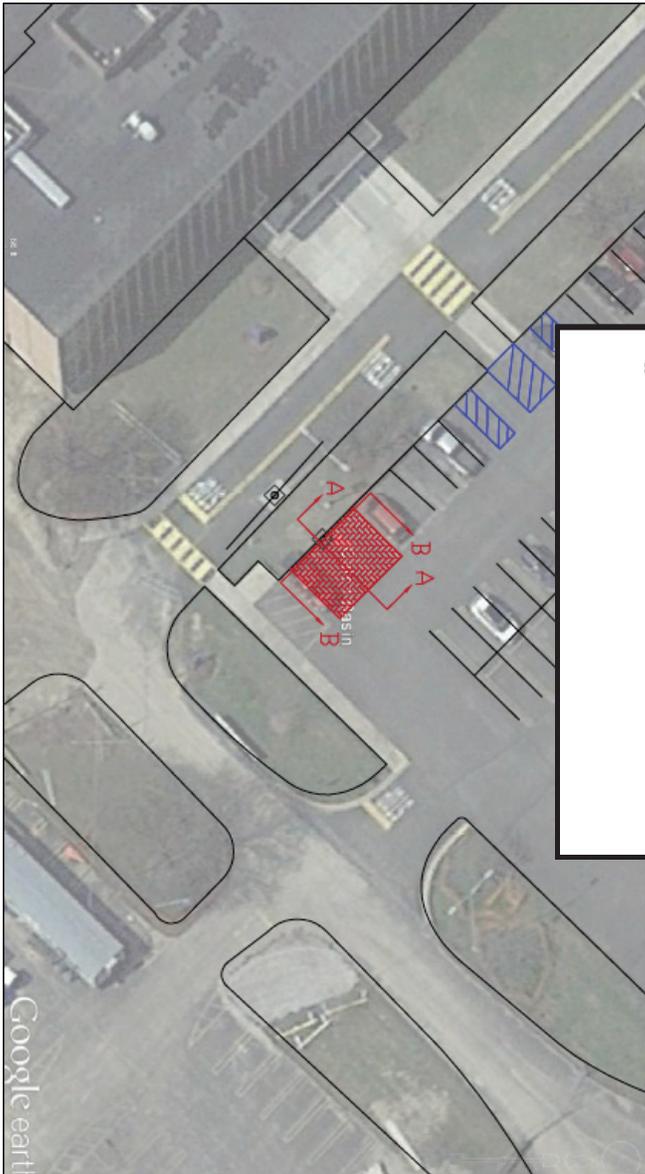


## LTU Integrated Drainage System Project



# Index

1)Project Description .....	3
<i>National Demonstration of Scalable Integrated Drainage System to Mitigate Parking Lot Stormwater Runoff</i>	
2)Project Overview .....	8
3)Press Release of the project .....	10

**Project Description:**

Lawrence Technological University is leading the collaboration of industry and academic partners in a multi-state demonstration project featuring the deployment of an innovative, scalable green infrastructure design that significantly mitigates parking lot stormwater runoff.

The project titled: *National Demonstration of Scalable Integrated Drainage System to Mitigate Parking Lot Stormwater Runoff*, involves retrofitting parking a lot drain to mitigate a 1 inch rain event in 24 hours.

LTU will oversee the design, installation, monitoring, and outcomes of five demonstration sites in the following states in collaboration with other academic institutions at each location:

- Michigan
- Ohio
- California
- Florida
- Washington, D.C.

These locations have been selected due to the variety of soils in their respective geographies, variable weather conditions, and existing professional contacts that exist between partner organizations.

**Implementation Plan:**

LTU's campus in Southfield, Michigan will be the first demonstration site. The installation protocols will be documented and used as the basis for the remaining locations, with the objective of improving the process with each installation. After five installations, LTU expects to establish a national design protocol for advancing this integrated drainage system.

In each location, a parking lot drain will be retrofitted using a combination of materials and technologies with the goal of establishing a new integrated drainage system that is replicable and scalable across the nation. Performance data (volumetric control, infiltration, soil moisture, etc.) will be collected at each of these sites and a final report, including design guidelines will be published with the results.

LTU has engaged Parjana Distribution (<http://parjanadistribution.com>) as one of the key technology partner on this project and will deploy Parjana's EGRP technology in each of the demonstration sites.

Parjana owns, sells, and distributes the Energy-Passive Groundwater Recharge Product (EGRP®), an innovative solution to improve water infiltration and mitigation which allows water to travel and filter naturally. Parjana is one of the industry's top source for a green solution in water management. EGRP is a very powerful, flexible and dynamic solution that can work along with gray or other green water management systems or independently.

**Support:**

The overall budget the project is estimated to be approximately \$400,000. LTU has secured a leadership gift of \$100,000 from a leading Foundation that supports the deployment of innovative green infrastructure projects that help the environment and advances economic development.

The University is actively pursuing additional funding of \$300,000, inclusive of in-kind gifts, from industry, academic and community partners to complete this national initiative and complete all installations by September 2016. Funding will be allocated to:

- Site Construction
- Monitoring Equipment
- Research Services
- Professional Services

**LTU Contact Information:**

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**Project Director:**

Donald D. Carpenter, Ph.D. Director, Great Lakes Stormwater Management Institute

Donald Carpenter, Ph.D., P.E., LEED AP is a Professor of Civil Engineering at Lawrence Technological University in Southfield MI. Dr. Carpenter is an accredited green design professional (LEED AP) and practicing professional engineer (PE) whose expertise includes green infrastructure; hydrology; innovative stormwater best management practices (BMPs); hydrologic and stormwater modeling and design; stream and watershed restoration; and environmental monitoring of engineered and natural systems. As founding Director of the Great Lakes Stormwater Management Institute at Lawrence Tech, he conducts research on and advises communities on how to implement innovative stormwater management practices. Dr. Carpenter routinely provides professional lectures and short courses on innovative stormwater treatment design and their role in LID implementation. In addition, he assists in organizing local and statewide conferences on green infrastructure. Dr. Carpenter's expertise in Low Impact Development led to his appointment as a member of the State of Michigan Low Impact Development (LID) Technical Implementation Committee that provided practical guidance for the development, dissemination, and implementation of the State of Michigan LID Manual. In 2013, he was elected to serve as a Governor for Cranbrook Institute of Science and a Director for the non-profit organization Pure Oakland Water. Finally, Dr. Carpenter is an active committee leader for the ASCE Environmental and Water Resources Institute and a member of the SEMCOG Clean Water Partners, MDEQ Green Infrastructure Committee, and Rouge River Advisory Council.

**Great Lakes Stormwater Management Institute:** [www.ltu.edu/water](http://www.ltu.edu/water)

Mission:

Effect positive environmental change in the Great Lakes Region through research, education, and practical application of Low Impact Development and stormwater management techniques

Vision:

To be an exemplary regional resource for citizens, policymakers, architects, and engineers through outreach and educational programs associated with innovative stormwater management techniques and low impact development strategies.

Benefit to Michigan and the Nation:

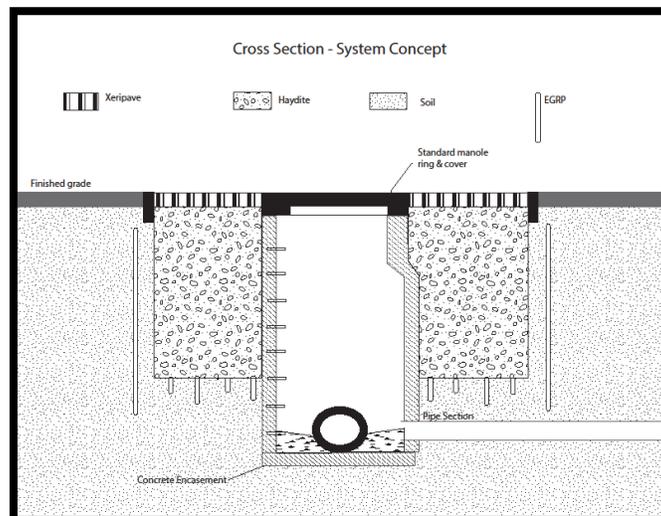
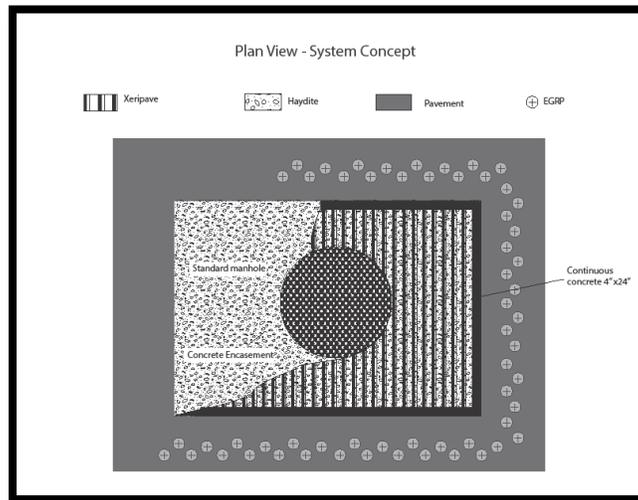
Lawrence Tech's Great Lakes Stormwater Management Institute will help improve Michigan's and the Great Lakes Region's water quality, quality of life, and blue / green economy, thereby making it easier to attract and retain water-use industries knowing that one of the Region's most valuable resources will be protected.

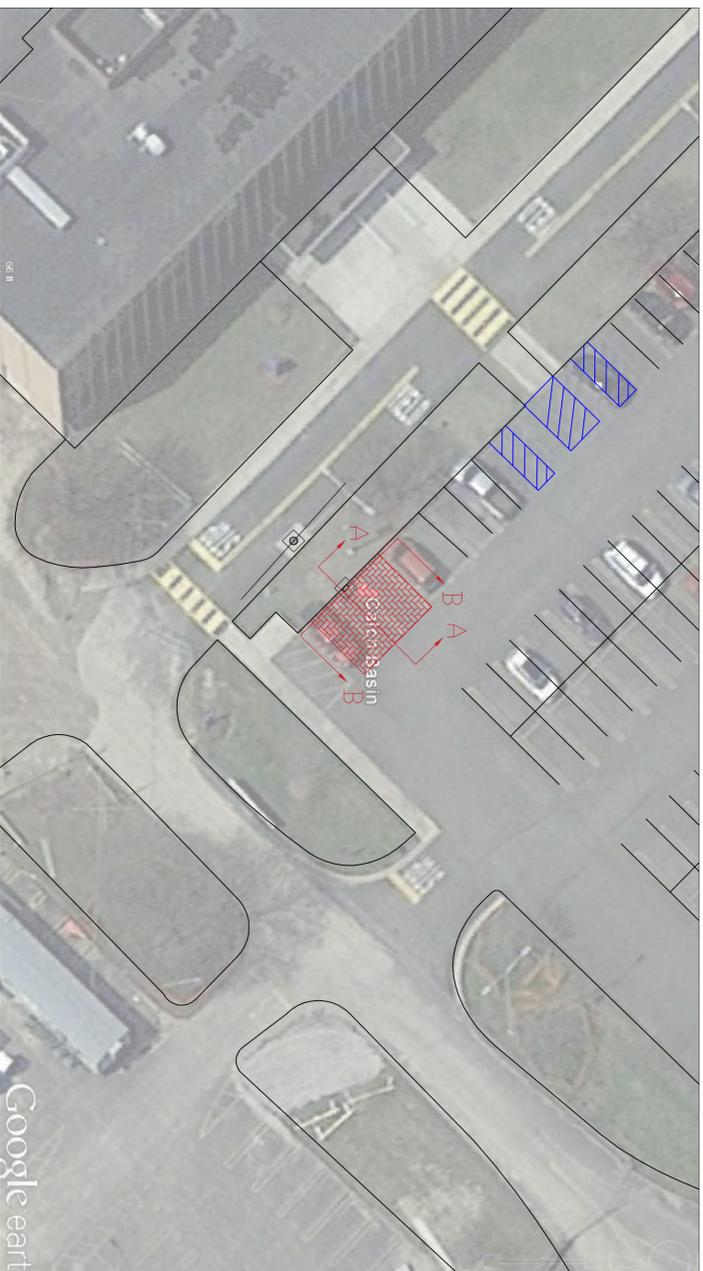
**About LTU:**

Lawrence Technological University, [www.ltu.edu](http://www.ltu.edu), is a private university founded in 1932 that offers more than 100 programs through the doctoral level in Colleges of Architecture and Design, Arts and Sciences, Engineering, and Management. The Brookings Institution ranks Lawrence Tech fifth nationwide for boosting graduates' earning power, PayScale lists it among the nation's top 100 universities for graduates' salaries, and U.S. News and World Report places it in the top tier of best Midwestern universities. Students benefit from small class sizes and a real-world, hands-on, "theory and practice" education with an emphasis on leadership. Activities on Lawrence Tech's 102-acre campus in Southfield, Michigan, include over 60 student organizations and NAIA varsity sports.

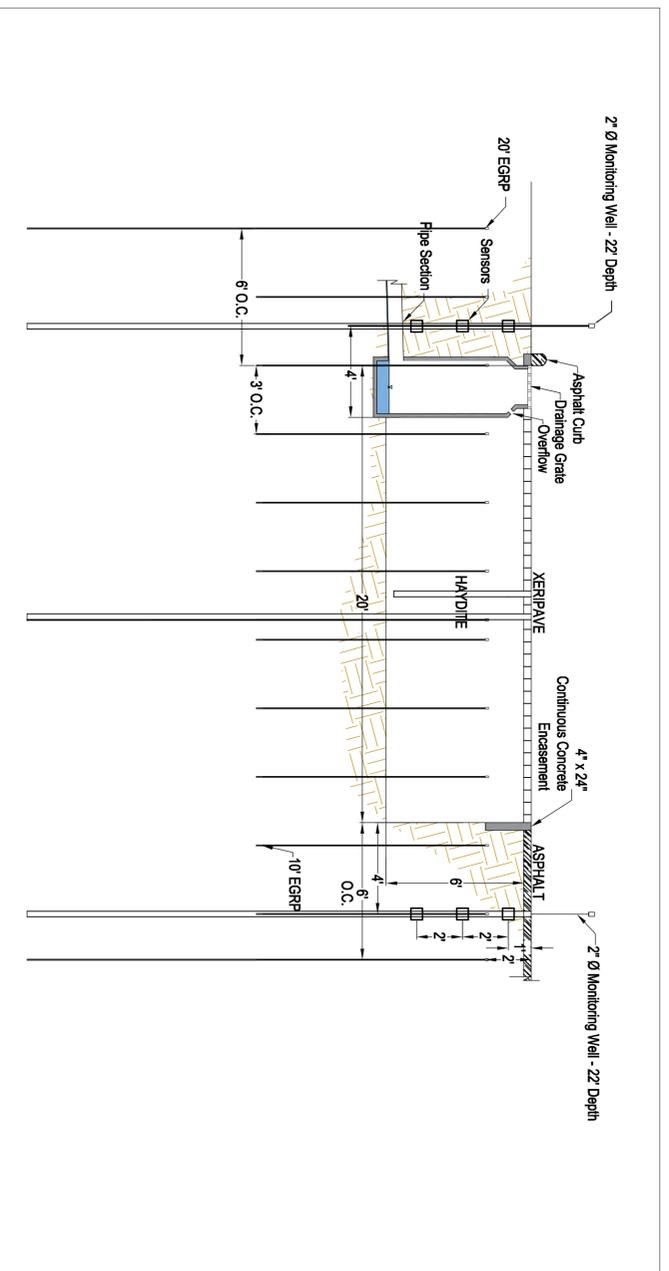
Lawrence Tech is currently the home of numerous innovative stormwater BMPs including a green roof, bioswale, porous pavers, naturalized areas, and rain gardens. Over the next several years, campus master plan updates include the installation of additional practical stormwater treatments, which include stormwater treatment wetlands, additional porous pavements (permeable asphalt, porous concrete, and porous pavement blocks), numerous rain gardens, naturalized riparian buffers, an infiltration basin, and an integrated drainage system that mitigates parking lot stormwater runoff with the ***goal of being the first university in the nation to mitigate 100% of stormwater runoff.***

**Example Overview of the Project:**

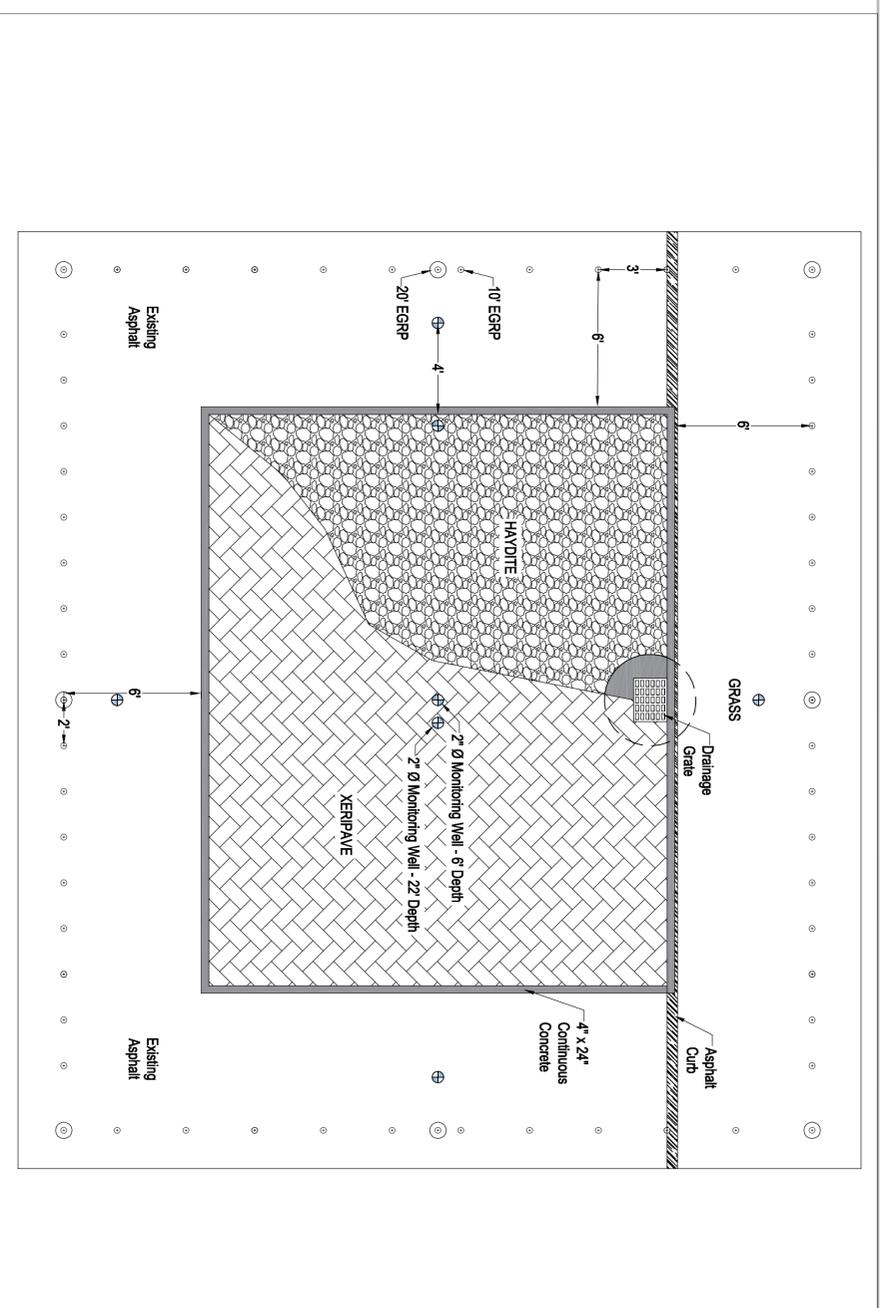




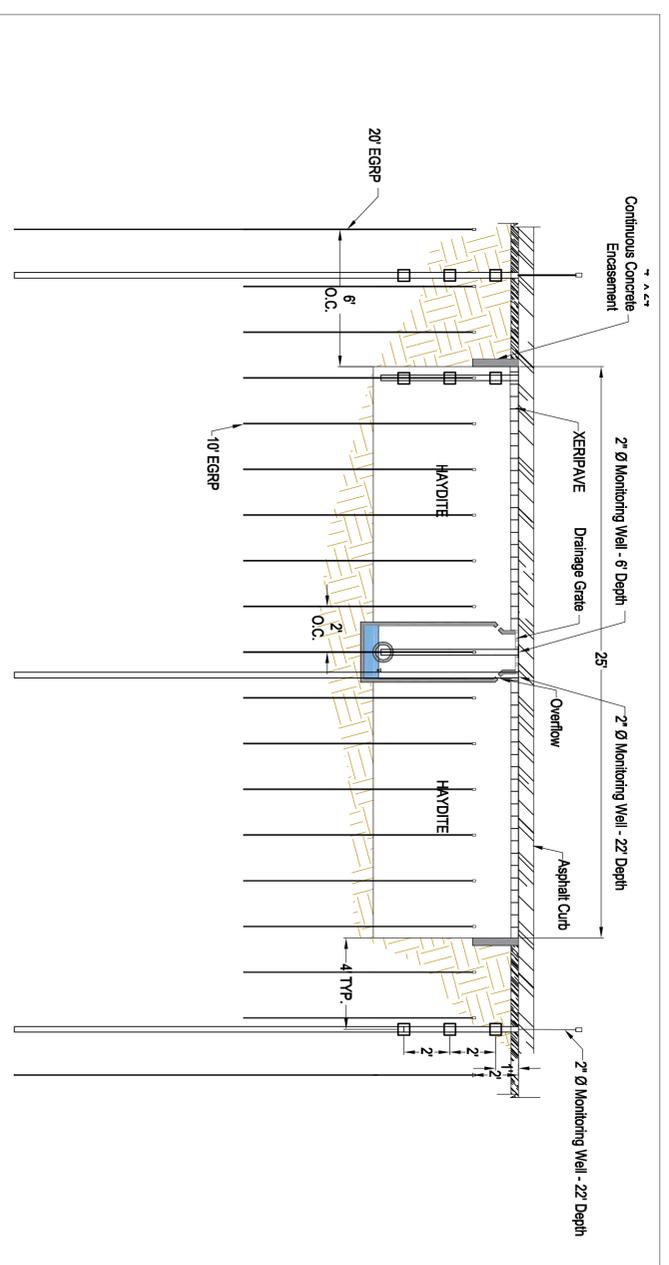
1  
0  
PROPOSED PARKING AREA  
SCALE: 3" = 1'-0"



1  
2  
PROPOSED CROSS SECTION A-A  
SCALE: 3" = 1'-0"



1  
1  
PLAN VIEW - SYSTEM CONCEPT  
SCALE: 3" = 1'-0"



1  
3  
PROPOSED CROSS SECTION B-B  
SCALE: 3" = 1'-0"

3 WORKING DAYS  
BEFORE YOU DIG  
CALL MISS DIG  
1-800-482-7171

LAWRENCE TECH  
UNIVERSITY  
SOUTHFIELD,  
MICHIGAN

DESIGNED BY \_\_\_\_\_ CHECKED BY \_\_\_\_\_  
C.BRAGG  
DRAWN BY \_\_\_\_\_ APPROVED BY \_\_\_\_\_

SHEET TITLE  
SCIENCE  
PARKING LOT  
PROPOSED  
PAVING PLAN

SCALE: AS SHOWN

NORTH



SHEET NUMBER

7

# LTU Integrated Drainage Project

Task Name	Start Date	End Date	Duration	Nov 22							Nov 29							Dec 6							Dec 13							Dec 20						
				S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S
<b>Project Preparation</b>	12/07/15	12/10/15	4d	Project Preparation																																		
Set up Kick Off meeting	12/07/15	12/07/15	1d	Set up Kick Off meeting																																		
<b>Place material orders/ Issue Purchase Orders</b>	12/07/15	12/10/15	4d	Place material orders/ Issue Purchase Orders																																		
Haydite	12/07/15	12/07/15	1d	Haydite																																		
Xeripave	12/07/15	12/07/15	1d	Xeripave																																		
Soil boring (SME)	12/07/15	12/07/15	1d	Soil boring (SME)																																		
Sensor box material purchase	12/07/15	12/07/15	1d	Sensor box material purchase																																		
concrete	12/07/15	12/07/15	1d	concrete																																		
<b>Mark Utilities</b>	12/08/15	12/08/15	1d	Mark Utilities																																		
Call Miss Dig	12/08/15	12/08/15	1d	Call Miss Dig																																		
LTU to mark other utilities	12/08/15	12/08/15	1d	LTU to mark other utilities																																		
City of Southfield to mark any utilities	12/08/15	12/08/15	1d	City of Southfield to mark any utilities																																		
<b>Mark installation layout on site</b>	12/08/15	12/10/15	3d	Mark installation layout on site																																		
Establish safety barrier around site	12/08/15	12/10/15	3d	Establish safety barrier around site																																		
Establish delivery area next to installation site of approximately 14 parking spaces	12/08/15	12/10/15	3d	Establish delivery area next to installation site of approximately 14 parking spaces																																		
<b>Install of Monitoring Wells</b>	12/14/15	12/15/15	2d	Install of Monitoring Wells																																		
SME and Water Recharge to coordinate installation during soil boring	12/14/15	12/15/15	2d	SME and Water Recharge to coordinate installation																																		
Receipt of Materials	12/14/15	12/15/15	2d	Receipt of Materials																																		
<b>Pervious Paved Area</b>	12/15/15	12/18/15	4d	Pervious Paved Area																																		
Saw cut 20' x 25' section of asphalt parking lot and curb	12/15/15	12/18/15	4d	Saw cut 20' x 25' section of asphalt p																																		
Excavate out to 6 feet deep and maintain structural integrity of existing parking lot sub-base	12/15/15	12/18/15	4d	Excavate out to 6 feet deep and main																																		
Remove asphalt and debris	12/15/15	12/18/15	4d	Remove asphalt and debris																																		
Repair or replace manhole depending on condition	12/15/15	12/18/15	4d	Repair or replace manhole dependin																																		
Install Haydite and compact per specifications to bottom of concrete barrier mark	12/15/15	12/18/15	4d	Install Haydite and compact per spec																																		
Create forms and pour 4" wide and 18" deep concrete barrier ribbon around inside edge of excavated area	12/15/15	12/18/15	4d	Create forms and pour 4" wide and 1																																		
Install balance of Haydite and compact per specification up to mark for Xeripave	12/15/15	12/18/15	4d	Install balance of Haydite and compa																																		
Install Xeripave	12/15/15	12/18/15	4d	Install Xeripave																																		
<b>Asphalt Area</b>	12/18/15	12/22/15	3d	Asphalt Area																																		
Core 3 1/2" holes on each mark	12/18/15	12/22/15	3d	Core 3 1/2" holes																																		
Install EGRP	12/18/15	12/22/15	3d	Install EGRP																																		
Patch holes in asphalt	12/18/15	12/22/15	3d	Patch holes in asp																																		
<b>Marketing &amp; PR</b>	11/23/15	12/17/15	19d	Marketing & PR																																		
Press Release to announce the project	11/23/15	12/01/15	7d	Press Release to announce the project																																		
Draft of PR	11/23/15	11/23/15	1d	Draft of PR																																		





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*For immediate release*

## **LTU will test new drainage system for parking lots**

*SOUTHFIELD, Mich.* – Lawrence Technological University (LTU) will be the first of several test sites around the country for an innovative drainage system for parking lots that is expected to significantly reduce stormwater runoff, a major source of water pollution.

LTU is partnering with Parjana Distribution LLC of Detroit to improve water infiltration and mitigation through the use of new green technology called energy-passive groundwater recharge products (EGRPs), which work by balancing soil moisture and facilitating the movement of water between horizontal soil layers. It is a unique and dynamic solution that addresses soil moisture imbalance, excess water runoff and lack of underground water recharging.

EGRP is a solution that can work along with gray or other green water management systems or independently. The new drainage system to be tested also incorporates technologies from Haydite and Xeripave.

LTU and Parjana have received a \$100,000 grant from a foundation and need to raise an additional \$300,000 to complete the pilot project that will include similar demonstrations in partnership with universities in Ohio, California, Florida and Washington, D.C. The LTU drainage system will be installed before Christmas, and the other four test projects should be completed by September 2016.

Each location will have monitoring equipment to gather performance data from the experimental drainage system. The results will be published with design guidelines. The goal is to develop a system that can be used across the country.

The new system, which will replace the existing drainage system in a parking lot, requires a six-foot excavation that is 20 feet by 25 feet, about the size of two parking spaces. A rounded, standard-size manhole is installed. The site is then covered with permeable pavement.

The system is designed to handle up to an inch of rain during a 24-hour period. “The first inch of rain represents the stormwater runoff volume with the highest pollutant loads, so capturing and infiltrating that volume will improve the water quality downstream,” said LTU Civil Engineering Professor Donald Carpenter, who is the project director.

Carpenter is the founding director of the Great Lakes Stormwater Management Institute at LTU. He has done extensive research on low-impact development techniques to reduce stormwater runoff, and served on the State of Michigan Low Impact Development Technical Implementation Committee.

Carpenter created a stormwater management education trail on the LTU campus that demonstrates several best management practices, including a green roof, a bioswale, porous pavers, naturalized areas, and rain gardens. The campus master plan calls for the installation of stormwater treatment

wetlands, additional porous pavement, rain gardens, naturalized riparian buffers, an infiltration basin, and an integrated drainage system that mitigates stormwater runoff from all the parking lots.

Greg McPartlin, CEO of Parjana Distribution, said the partnership with LTU gives his company the opportunity to use its innovative technology to improve an important aspect of green infrastructure. “Stormwater runoff is one of the most pressing issues of development for municipalities and corporations. We expect this project will be an ultimate guideline to design and implement integrated green infrastructure for the future,” McPartlin said.

Lawrence Technological University, [www.ltu.edu](http://www.ltu.edu), is a private university founded in 1932 that offers more than 100 programs through the doctoral level in Colleges of Architecture and Design, Arts and Sciences, Engineering, and Management. The Brookings Institution ranks Lawrence Tech fifth nationwide for boosting graduates’ earning power, PayScale lists it in the nation’s top 10 percent of universities for graduates’ salaries, and *U.S. News and World Report* places it in the top tier of best Midwestern universities. Students benefit from small class sizes and a real-world, hands-on, “theory and practice” education with an emphasis on leadership. Activities on Lawrence Tech’s 107-acre campus in Southfield, Michigan, include over 60 student organizations and NAIA varsity sports.

# # #