MERRILLVILLE

LOW IMPACT DEVELOPMENT

Call to Action

SWS 2018 CONFERENCE & EXHIBITION

Presented by: Matthew Lake, M.S., CPMSM

Executive Director

Defining Low Impact Development

WIKIPEDIA
The Free Encyclopedia

Low-impact development (LID) is a term used to describe a land planning and engineering design approach to manage stormwater runoff. LID emphasizes conservation and use of on-site natural features to protect water quality. This approach implements engineered small-scale hydrologic controls to replicate the pre-development hydrologic regime of watersheds through infiltrating, filtering, storing, evaporating, and detaining runoff close to its source.

5 Basic Principals

There are 5 core requirements when it comes to designing for LID…

- Conserve natural areas wherever possible
  (minimize habitat loss and fragmentation)
- Minimize the development impact on hydrology
  (don't pave over the whole site if you don't need to)
- Maintain runoff rate and duration from the site
  (don't let the water leave the site)

- Scatter integrated management practices throughout your site
  (controls that infiltrate, store, evaporate, and/or detain runoff close to the source)
- Implement pollution prevention, proper maintenance and public education
  (signage, O&M plans, filtration devices)

Benefits of Low Impact Development

For residents:

- increases community character
- improves quality of life
- more access to trails and open space
- pedestrian-friendly

For developers:

- reduces land clearing and grading costs
- reduces infrastructure costs (streets, curbs, gutters, sidewalks)
- increases lot values and community marketability

For communities:

- balances growth needs with environmental protection
- reduces infrastructure and utility maintenance costs

For the environment:

- protects environmentally-sensitive areas
- increases wildlife habitat by preserving trees and vegetation
- protects water quality by reducing pollutant loads
- reduces stream bank and channel erosion by reducing peak flows and moderating the frequent bounce associated with lower intensity storms
- reduces flooding potential

SO WHY IS THIS NOT THE CURRENT STANDARD?

Some Entities are Implementing LID

Adopted some form of new standards

- Tippecanoe County
- Vigo County
- Boone County
- Tipton County
- Big Cicero Creek Joint Drainage Board
- City of Lafayette
- Town of Merrillville
- City of West Lafayette
- City of Westfield
- City of Lebanon
- City of Zionsville

In process of adopting new standards

- Hendricks County
- Hamilton County
- City of Franklin
- City of Greenwood
- City of Terre Haute
- City of Fishers
- City of Noblesville
- City of Carmel
- City of Jeffersonville

Stereotypical Barriers….

Costs?

LID is economical. Typically it costs less than conventional stormwater management systems to construct and maintain, in part, because of fewer pipes, fewer below-ground infrastructure requirements, and less imperviousness. It is a more environmentally sound technology and a more economically sustainable approach to addressing the adverse impacts of urbanization. New techniques and products are making implementation even more cost-effective.

Takes away space?

Space once dedicated to stormwater ponds can now be used for additional development to increase lot yields or be left as is for conservation or to meet open space ordinance requirements.

Maintenance?

The greater use of on-lot multi-purpose landscaping / vegetation also offers human "quality of life" opportunities by greening neighborhoods and contributing to livability, value, sense of place, and aesthetics. Other benefits include enhanced property values and re-development potential, greater marketability, improved wildlife habitat, thermal pollution reduction, energy savings, smog reduction, enhanced wetlands protection, and decreased flooding. many projects, the LID practice was originally designed as a landscaped feature before its functionality as a stormwater control was introduced. In these situations, the landscaping and construction costs for stormwater are essentially free.

Will delay my project?

Local permitting agencies can use LID as a model in revising local zoning and subdivision regulations in favor of more cost-effective, ecologically sound development practices. This will prevent delays from receiving project approval

Do we need LID?

The need for such an approach has never been greater. Stormwater programs require that a wide array of complex and challenging ecosystem and human health protection goals be addressed. Many of these goals are not being met by conventional stormwater management technology, and communities are struggling with the economic reality of funding aging and ever-expanding stormwater infrastructure.

What is Your approach to LID?

Voluntary Approach *(politically accepted & minimally effective)*

- Wait for a progressive developer to construct a sustainable non-conventional development
- Community does “special projects” for demonstration
- Offer incentives to reduce local SW fees in exchange for installing post-construction BMPs

Expensive for Municipality

Mandatory Approach *(more politically controversial & very effective)*

- Establish Requirements for New & Re-development
  - Open Space Ordinance
  - Landscape Ordinance
  - Stormwater Ordinance with LID
  - New Roadway Engineering Standards

Virtually no Expense for Municipality

HOW CAN WE IMPLEMENT MANDATORY LID REQUIREMENTS?

Strategically Introduce LID

Get political acceptance

- Have to market and explain to get consensus
- Special council workshop to introduce the idea
- Recommend a simple approach (foot-in-door)
- Implement an achievable standard that will not completely redefine development
- Allows engineers and developers to acclimate to LID

(can "ramp up" requirements later)

Prepare sample ordinances and standards

- Provide scenarios using previous development projects with proposed requirements
- Keep your standards simple (don't over complicate your methods)
- Allow for flexibility (LID practices need to fit each site)
- Can make LID requirements part of SW Ordinance

Education/Outreach

- Host workshops to explain the overall concept and advantages
- Present specifically to local developers & engineers

Timing

- Sometime you have to wait for specific opportunity
- Need key players in place to implement new/revised ordinances

Merrillville Low Impact Development Standards

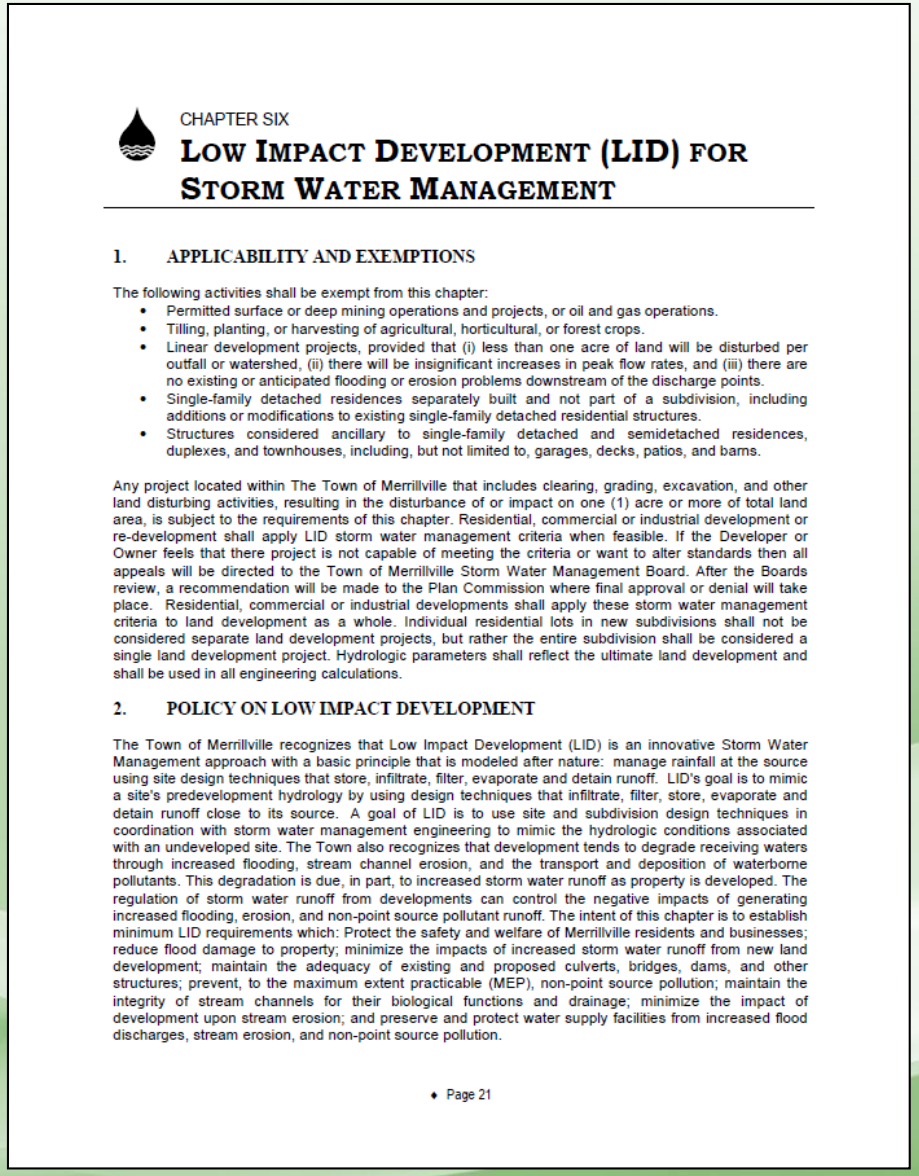
- First Community in NW Indiana to develop and implement Low Impact Development Standards
- LID was added intentionally as a separate chapter so it's not overlooked
- LID implementation is required to get a Stormwater Permit
- LID is above and beyond 80%TSS and existing detention requirements
- Often results in meetings with developers and engineers prior to detailed site design

Abbreviated Table of Contents

LID Chapter

Added Chapter 6 - Low Impact Development for Storm Water Management

- Establishes additional BMP criteria for development and redevelopment projects
- Innovative SW management approach modeled after nature and incorporation of infiltration
- Improved Site Design + Storm Water Management Engineering = mimic pre-development hydrologic conditions



CHAPTER SIX

LOW IMPACT DEVELOPMENT (LID) FOR STORM WATER MANAGEMENT

1. APPLICABILITY AND EXEMPTIONS

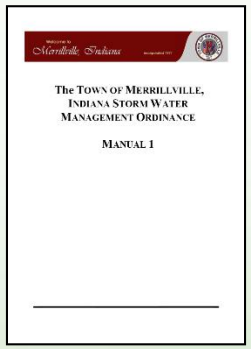
The following activities shall be exempt from this chapter:

- Permitted surface or deep mining operations and projects, or oil and gas operations.
- Tilling, planting, or harvesting of agricultural, horticultural, or forest crops.
- Linear development projects, provided that (i) less than one acre of land will be disturbed per outfall or watershed, (ii) there will be insignificant increases in peak flow rates, and (iii) there are no existing or anticipated flooding or erosion problems downstream of the discharge points.
- Single-family detached residences separately built and not part of a subdivision, including additions or modifications to existing single-family detached residential structures.
- Structures considered ancillary to single-family detached and semidetached residences, duplexes, and townhouses, including, but not limited to, garages, decks, patios, and barns.

Any project located within The Town of Merrillville that includes clearing, grading, excavation, and other land disturbing activities, resulting in the disturbance of or impact on one (1) acre or more of total land area, is subject to the requirements of this chapter. Residential, commercial or industrial development or re-development shall apply LID storm water management criteria when feasible. If the Developer or Owner feels that there project is not capable of meeting the criteria or want to alter standards then all appeals will be directed to the Town of Merrillville Storm Water Management Board. After the Boards review, a recommendation will be made to the Plan Commission where final approval or denial will take place. Residential, commercial or industrial developments shall apply these storm water management criteria to land development as a whole. Individual residential lots in new subdivisions shall not be considered separate land development projects, but rather the entire subdivision shall be considered a single land development project. Hydrologic parameters shall reflect the ultimate land development and shall be used in all engineering calculations.

2. POLICY ON LOW IMPACT DEVELOPMENT

The Town of Merrillville recognizes that Low Impact Development (LID) is an innovative Storm Water Management approach with a basic principle that is modeled after nature: manage rainfall at the source using site design techniques that store, infiltrate, filter, evaporate and detain runoff. LID's goal is to mimic a site's predevelopment hydrology by using design techniques that infiltrate, filter, store, evaporate and detain runoff close to its source. A goal of LID is to use site and subdivision design techniques in coordination with storm water management engineering to mimic the hydrologic conditions associated with an undeveloped site. The Town also recognizes that development tends to degrade receiving waters through increased flooding, stream channel erosion, and the transport and deposition of waterborne pollutants. This degradation is due, in part, to increased storm water runoff as property is developed. The regulation of storm water runoff from developments can control the negative impacts of generating increased flooding, erosion, and non-point source pollutant runoff. The intent of this chapter is to establish minimum LID requirements which: Protect the safety and welfare of Merrillville residents and businesses; reduce flood damage to property; minimize the impacts of increased storm water runoff from new land development; maintain the adequacy of existing and proposed culverts, bridges, dams, and other structures; prevent, to the maximum extent practicable (MEP), non-point source pollution; maintain the integrity of stream channels for their biological functions and drainage; minimize the impact of development upon stream erosion; and preserve and protect water supply facilities from increased flood discharges, stream erosion, and non-point source pollution.


Merrillville, Indiana

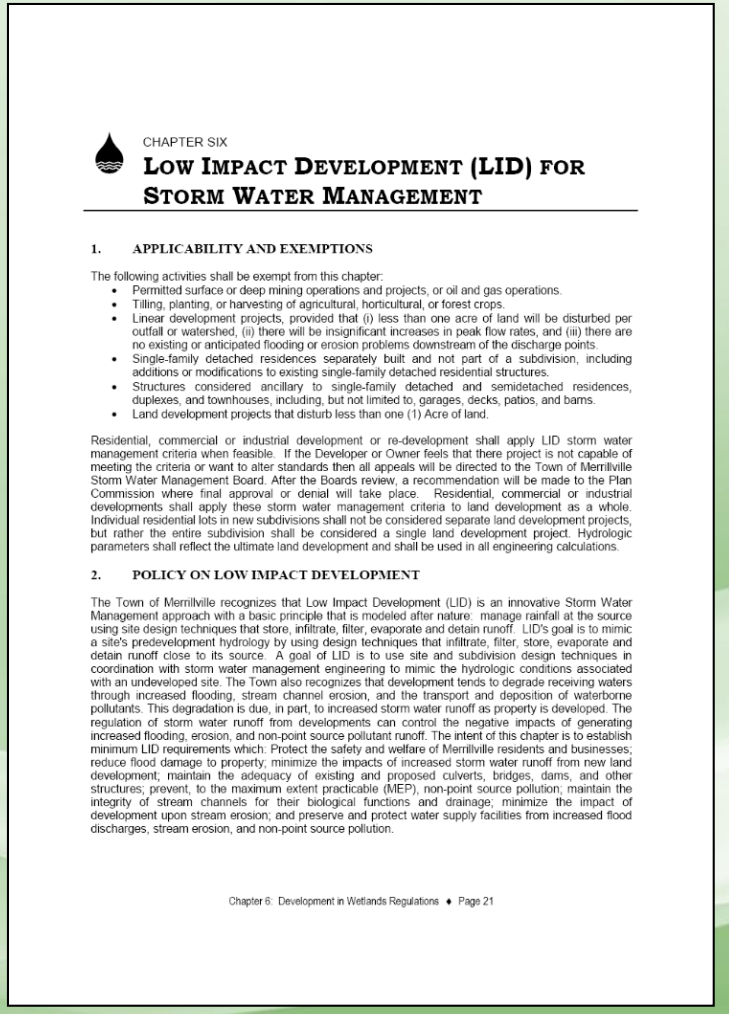
The Town of Merrillville,
Indiana Storm Water
Management Ordinance

Manual 1

Revised Ordinance & Tech. Standards Manual

6. COMPLIANCE - LID WATER QUALITY BMP POINTS SYSTEM

Compliance with LID non-point source pollution control requirements is based on a points system. This is a tool for screening BMPs to ensure that the site is adequately covered by preferred practices. The points assigned to each BMP are weighted by the proportion of the site served by the BMP. To achieve compliance, a storm water management plan must attain at least **100 LID Points per each Disturbed Acre** of development through implementation of approved practices. A minimum of three (3) different BMPs must be incorporated for each development. Practices utilized must be approved by the Storm Water Management Board. The BMPs utilized to satisfy the 80% TSS removal rate requirements cannot be counted as part of the required LID point total.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- Structures considered ancillary to single-family detached and semidetached residences, duplexes, and townhouses, including, but not limited to, garages, decks, patios, and barns.
- Land development projects that disturb less than one (1) Acre of land.

Residential, commercial or industrial development or re-development shall apply LID storm water management criteria when feasible. If the Developer or Owner feels that there project is not capable of meeting the criteria or want to alter standards then all appeals will be directed to the Town of Merrillville Storm Water Management Board. After the Boards review, a recommendation will be made to the Plan Commission where final approval or denial will take place. Residential, commercial or industrial developments shall apply these storm water management criteria to land development as a whole. Individual residential lots in new subdivisions shall not be considered separate land development projects, but rather the entire subdivision shall be considered a single land development project. Hydrologic parameters shall reflect the ultimate land development and shall be used in all engineering calculations.

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Chapter 6: Development in Wetlands Regulations ♦ Page 21

Points System for LID

- Each BMP has a point value based on quantity
- A score of 100 LID Points must be achieved for every acre of land disturbance
- Projects not capable of meeting criteria can appeal to SWMB

Table 6-1: LID Point System for evaluating acceptable water quality BMPs

Factsheet #	LOW IMPACT DEVELOPMENT BMP	Quantity	LID Points
PC-101	Bio-Retention Facility (Rain Garden)	100sf	20
PC-102	Catch Basin Inserts	1ea	10
PC-103	Cistern / Dry Well	1ea	10
PC-104	Constructed Wetland	100sf	20
PC-105	Dry Extended Detention Basins	100sf	20
PC-106	Infiltration Basin	100sf	10
PC-107	Infiltration Trench	100sf	10
PC-108	Media Filtration	1ea	10
PC-109	Storm Drain Inserts/ Hydrocarbon Filter	1ea	10
PC-110	Vegetated Filter Strips	100sf	10
PC-111	Vegetated Swales	100 linear ft.	10
PC-112	Wet Ponds / Retention Basins	100sf	20
LID-101	Pervious Pavement With Infiltration Bed	100sf	10
LID-102	Vegetated Roof	100sf	15
LID-103	Level Spreaders	100 linear ft	15
LID-104	Hydrodynamic Separator	1ea	50
LID-105	Two Stage Ditch	100 linear ft	15
LID-106	Riparian Buffer Restoration	100sf	5
LID-107	Wetland Restoration/Creation	100sf	20
LID-108	Cluster Design	1ac	10
LID-109	Open Space Conservation	100sf	10
LID-110	Sensitive Area Protection	100sf	10
LID-111	Design for LEED Certification	1ac	20
LID-112	Native Revegetation	100sf	10
LID-113	Stormwater Disconnectivity	1ea	5-commercial 1-residential
LID-114	Additional Tree Installation	1ea	5
LID-115	Soft Armoring	100sf	20
N/A	Emerging Technology	variable	variable

LID Worksheet

- Applicant needs 100 LID Points/Acre of disturbance as an additional requirement for their SW Permit
- The quantity of BMP is calculated along with total points for each BMP
- Any new emerging practices or technologies will be considered

LID Compliance Summary Worksheet (Table 6-2)

Project Information

Project Name		**Developer/ Owner**	
Plan Preparer		**Developer/Owner Address**	
Plan Preparer Telephone		**Developer/Owner Telephone**	

This worksheet is a tool to allow both the Municipality and the Developer/Owner to reference various measures implemented within the development in order to meet the development's Storm Water Management Ordinance requirements.

Site Specific Information

Total Site Area (ac)	
Total Disturbed Area (ac)	
Total Required LID Points (disturbed acres x 100)	

LOW IMPACT DEVELOPMENT BMP	Quantity of BMP	LID Points	Proposed Quantity	Proposed LID Points
Bio-Retention Facility (Rain Garden)	100sf	20		
Catch Basin Inserts	1ea	10		
Cistern/Dry Well	1ea	10		
Constructed Wetland	100sf	20		
Dry Extended Detention Basins	100sf	20		
Infiltration Basin	100sf	10		
Infiltration Trench	100sf	10		
Media Filtration	1ea	10		
Storm Drain Inserts / Hydrocarbon Filters	1ea	10		
Vegetated Filter Strips	100sf	10		
Vegetated Swales	100 linear ft.	10		
Wet Ponds/Retention Basins	100sf	20		
Pervious Pavement with Infiltration Bed	100sf	10		
Vegetated Roof	100sf	15		
Level Spreaders	100 linear ft	15		
Hydrodynamic Separator	1ea	50		
Two Stage Ditch	100 linear ft	15		
Riparian Buffer Restoration	100sf	5		
Wetland Restoration/Creation	100sf	20		
Cluster Design	1ac	10		
Open Space Conservation	100sf	10		
Sensitive Area Protection	100 linear ft.	10		
LEED Certification	1ac	20		
Native Revegetation	100sf	10		
Stormwater Disconnectivity	1ea	5-commercial 1-residential		
Additional Tree Installation	1ea	5		
Design for LEED Certification	100sf	20		
Emerging Technology	variable	variable		
OTHER-	variable	variable		
OTHER-	variable	variable		

Total Proposed LID Points

Note: Not all LID measures are necessary or appropriate for every site. It is imperative that proper site assessments and due diligence is completed by the Developer and/or Engineer prior to design.

Technical Standards Manual

- Technical Standards Manual was also updated since it's a supporting document that is referenced in the ordinance.
- Included updated BMPs or construction and Post-construction
- Added more BMP factsheets for LID

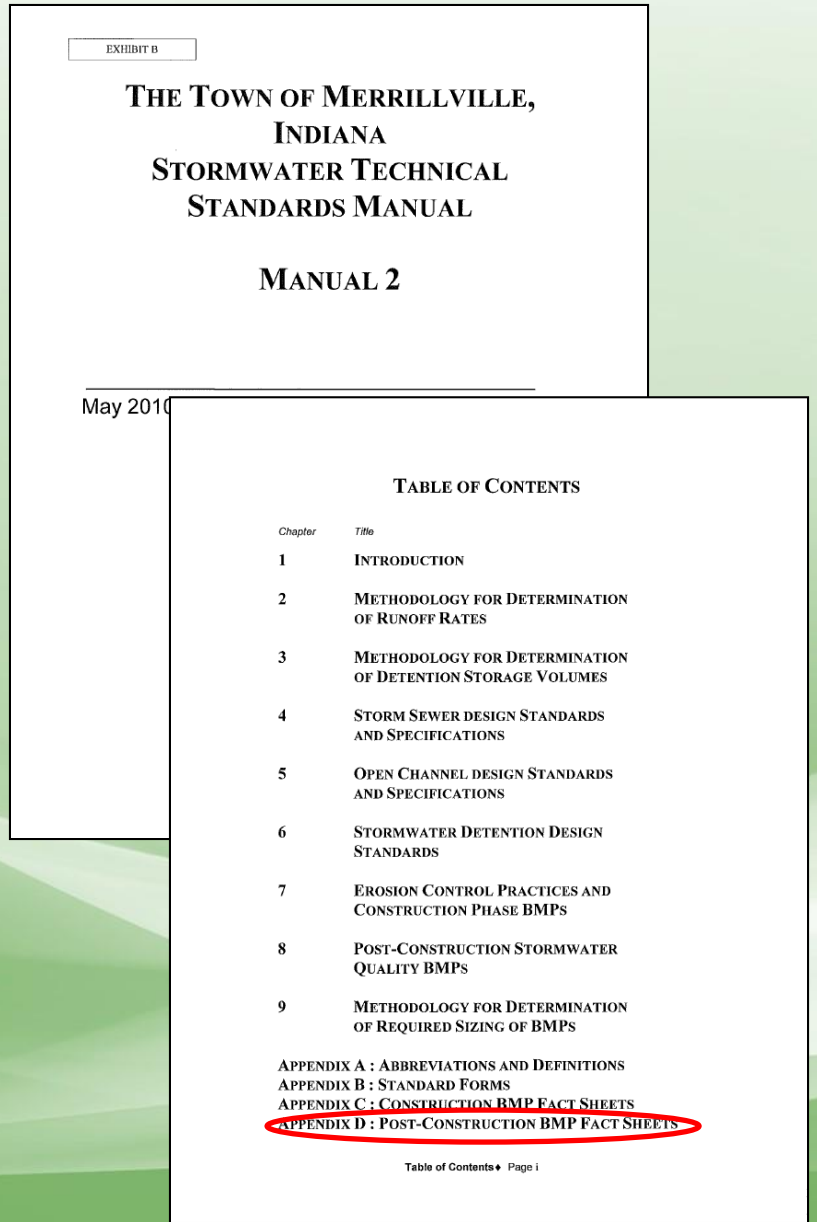


EXHIBIT B

THE TOWN OF MERRILLVILLE,
INDIANA
STORMWATER TECHNICAL
STANDARDS MANUAL

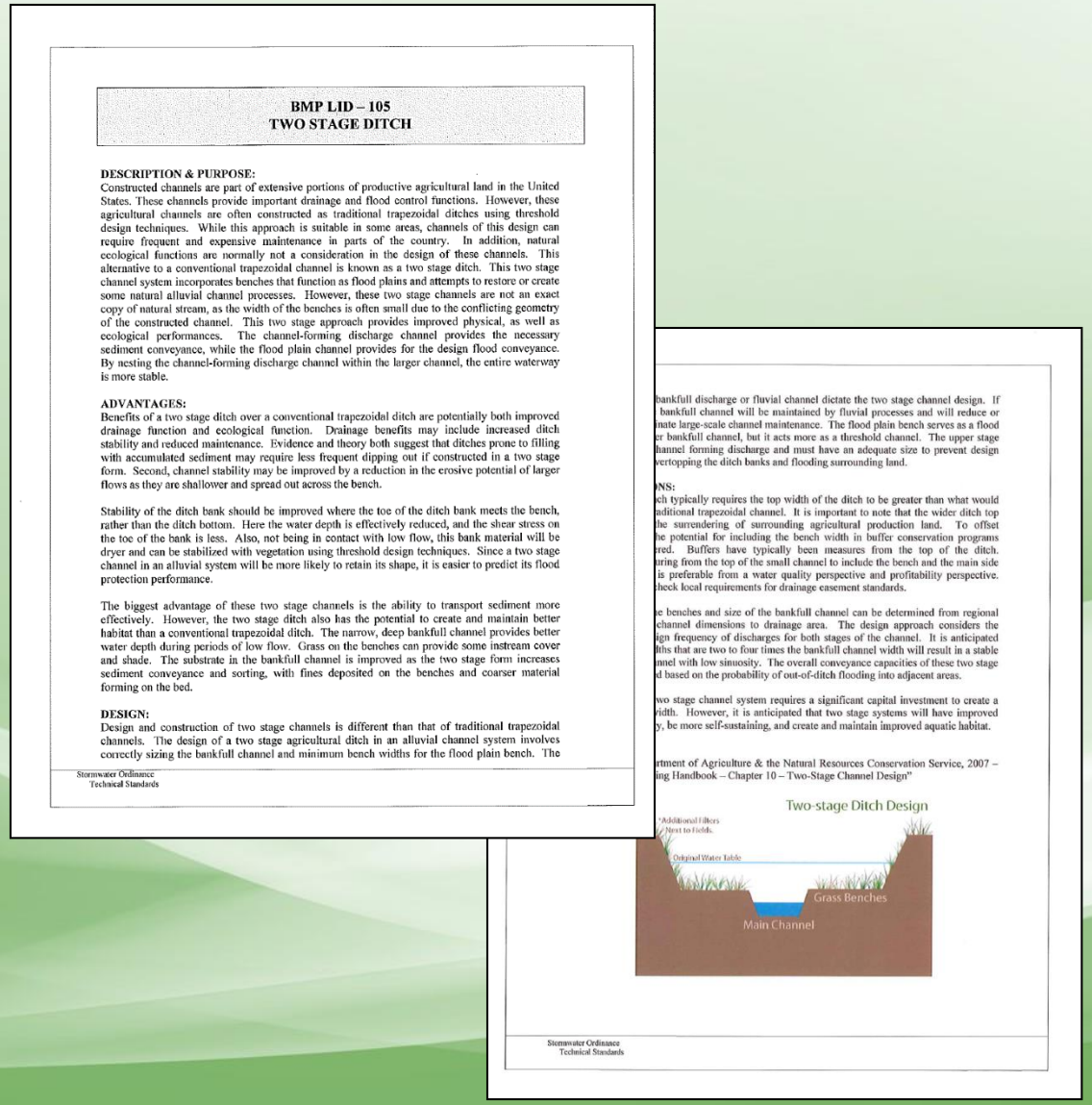
MANUAL 2

May 201

TABLE OF CONTENTS

Low Impact Development BMP Factsheets

- Revised Appendix D to Include additional BMPs for Low Impact Development Strategies.
- Factsheets contain details and specifications as well as advantages of each practice.
- Additional BMPs can be added after they are proven effective.
- Need to setup protocol to accept new techniques or devices.



BMP LID – 105
TWO STAGE DITCH

DESCRIPTION & PURPOSE:
Constructed channels are part of extensive portions of productive agricultural land in the United States. These channels provide important drainage and flood control functions. However, these agricultural channels are often constructed as traditional trapezoidal ditches using threshold design techniques. While this approach is suitable in some areas, channels of this design can require frequent and expensive maintenance in parts of the country. In addition, natural ecological functions are normally not a consideration in the design of these channels. This alternative to a conventional trapezoidal channel is known as a two stage ditch. This two stage channel system incorporates benches that function as flood plains and attempts to restore or create some natural alluvial channel processes. However, these two stage channels are not an exact copy of natural stream, as the width of the benches is often small due to the conflicting geometry of the constructed channel. This two stage approach provides improved physical, as well as ecological performances. The channel-forming discharge channel provides the necessary sediment conveyance, while the flood plain channel provides for the design flood conveyance. By nesting the channel-forming discharge channel within the larger channel, the entire waterway is more stable.

ADVANTAGES:
Benefits of a two stage ditch over a conventional trapezoidal ditch are potentially both improved drainage function and ecological function. Drainage benefits may include increased ditch stability and reduced maintenance. Evidence and theory both suggest that ditches prone to filling with accumulated sediment may require less frequent dipping out if constructed in a two stage form. Second, channel stability may be improved by a reduction in the erosive potential of larger flows as they are shallower and spread out across the bench.

Stability of the ditch bank should be improved where the toe of the ditch bank meets the bench, rather than the ditch bottom. Here the water depth is effectively reduced, and the shear stress on the toe of the bank is less. Also, not being in contact with low flow, this bank material will be dryer and can be stabilized with vegetation using threshold design techniques. Since a two stage channel in an alluvial system will be more likely to retain its shape, it is easier to predict its flood protection performance.

The biggest advantage of these two stage channels is the ability to transport sediment more effectively. However, the two stage ditch also has the potential to create and maintain better habitat than a conventional trapezoidal ditch. The narrow, deep bankfull channel provides better water depth during periods of low flow. Grass on the benches can provide some instream cover and shade. The substrate in the bankfull channel is improved as the two stage form increases sediment conveyance and sorting, with fines deposited on the benches and coarser material forming on the bed.

DESIGN:
Design and construction of two stage channels is different than that of traditional trapezoidal channels. The design of a two stage agricultural ditch in an alluvial channel system involves correctly sizing the bankfull channel and minimum bench widths for the flood plain bench. The

Stormwater Ordinance
Technical Standards

bankfull discharge or fluvial channel dictate the two stage channel design. If
bankfull channel will be maintained by fluvial processes and will reduce or
inate large-scale channel maintenance. The flood plain bench serves as a flood
er bankfull channel, but it acts more as a threshold channel. The upper stage
hannel forming discharge and must have an adequate size to prevent design
vertopping the ditch banks and flooding surrounding land.

NS:
ch typically requires the top width of the ditch to be greater than what would
additional trapezoidal channel. It is important to note that the wider ditch top
he surrendering of surrounding agricultural production land. To offset
he potential for including the bench width in buffer conservation programs
red. Buffers have typically been measures from the top of the ditch.
uring from the top of the small channel to include the bench and the main side
is preferable from a water quality perspective and profitability perspective.
heck local requirements for drainage easement standards.

e benches and size of the bankfull channel can be determined from regional
channel dimensions to drainage area. The design approach considers the
ign frequency of discharges for both stages of the channel. It is anticipated
lths that are two to four times the bankfull channel width will result in a stable
nnel with low sinuosity. The overall conveyance capacities of these two stage
d based on the probability of out-of-ditch flooding into adjacent areas.

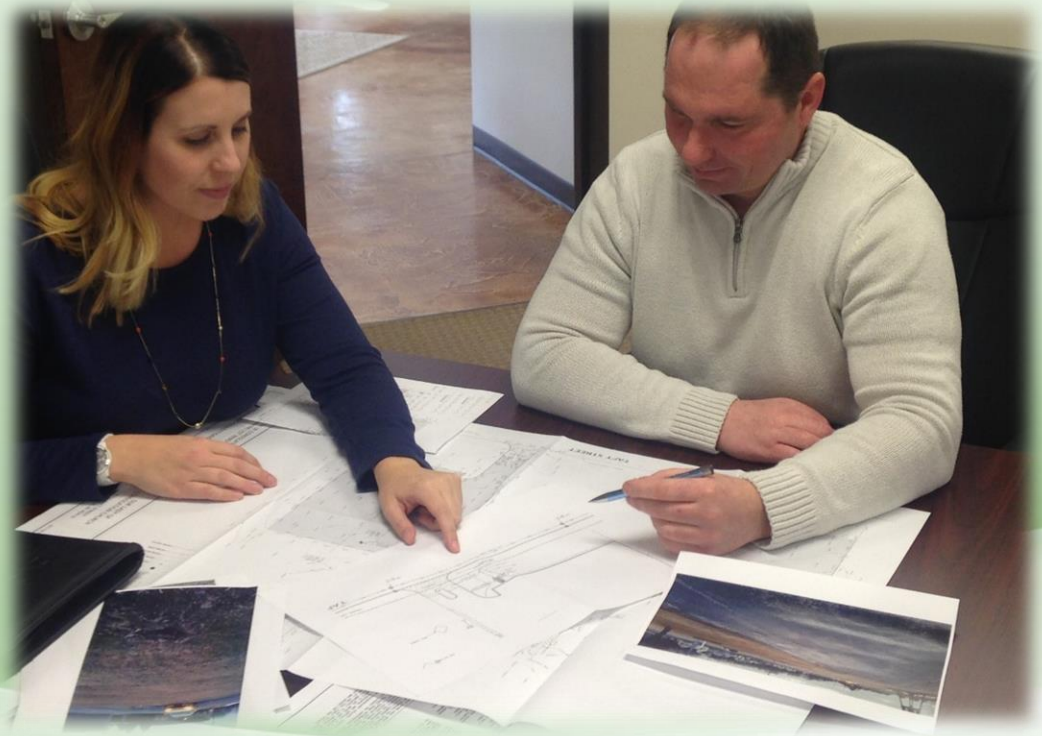
wo stage channel system requires a significant capital investment to create a
idth. However, it is anticipated that two stage systems will have improved
y, be more self-sustaining, and create and maintain improved aquatic habitat.

rtment of Agriculture & the Natural Resources Conservation Service, 2007 –
ing Handbook – Chapter 10 – Two-Stage Channel Design"

Stormwater Ordinance
Technical Standards

LID Plan Reviews

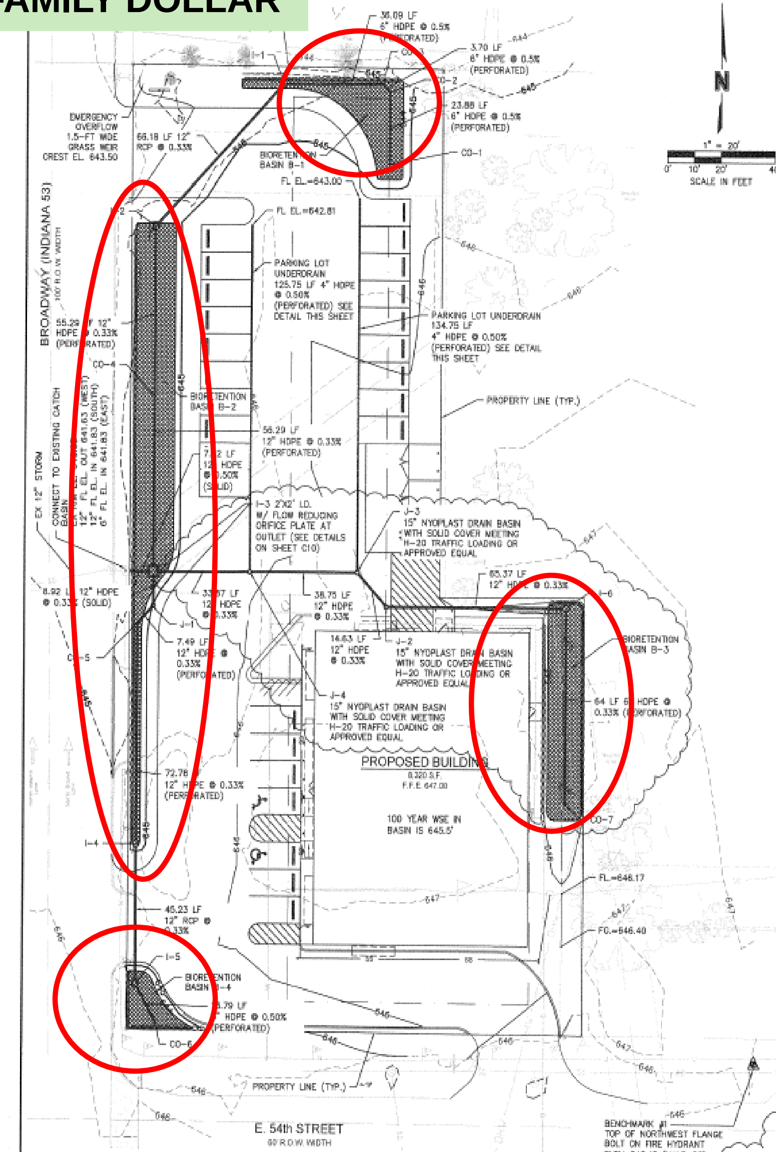
- One of the benefits is getting the engineer to contact and work with local review authority early in the plan development process
- Plans are reviewed for all stormwater quantity and quality requirements
- Will typically have to work with the engineer and developer on meeting all requirements including LID **(100 LID Points for each disturbed Acre)**
- Final As-built inspections to ensure BMPs are installed



SWS 2018 CONFERENCE & EXHIBITION

DOES THIS LID REQUIREMENT WORK?

FAMILY DOLLAR



BIORETENTION BASIN SCHEDULE						
BASIN	AREA (SF)	BOTTOM ELEVATION (FT)	PONDING DEPTH (FT)	PLANTING MIX THICKNESS (FT)	STORAGE LAYER THICKNESS (FT)	* STORAGE VOLUME (CF)
B-1	677	644.00	0.25	3.00	2.25	1180
B-2	2054	644.30	0.5	3.00	0.83	3130
B-3	930	645.00	0.25	3.00	2.67	1749
B-4	253	644.00	0.5	4.00	3.88	701
*VOLUME= AREA(PONDING DEPTH + 0.25*PLANTING MIX DEPTH + 0.33*STORAGE LAYER DEPTH)					TOTAL VOLUME = 6760	

INLET SCHEDULE						
INLET	TYPE	GRATE ELEVATION	PIPE FLOW LINE (NORTH)	PIPE FLOW LINE (SOUTH)	PIPE FLOW LINE (WEST)	PIPE FLOW LINE (EAST)
I-1	24" I.D. DIA	644.25	-	642.65	-	642.75
I-2	24" I.D. DIA	644.80	642.43	642.33	-	-
I-3	2'x2' I.D. BOX	644.80	641.97	641.97	641.80	641.97
J-1	15" I.D. DIA	645.00	642.00	642.10	-	-
J-2	15" I.D. DIA	646.39			642.45	642.55
J-3	15" I.D. DIA	646.23	642.40		642.30	642.40
J-4	15" I.D. DIA	645.88	642.18		642.08	642.18
I-4	24" I.D. DIA	644.80	642.36	642.46	-	-
I-5	24" I.D. DIA	644.50	642.61	642.71		
I-6	24" I.D. DIA	646.25		642.88	642.78	

CLEAN OUT SCHEDULE				
INLET	SIZE	TYPE	*LID ELEVATION	PIPE FLOW LINE
CO-1	6.00	END	644.00	643.07
CO-2	6.00	45° BEND	644.00	642.95
CO-3	6.00	45° BEND	644.00	642.12
CO-4	6.00	THRU	644.30	642.15
CO-5	6.00	45° BEND	644.30	642.10
CO-6	6.00	END	644.00	642.78
CO-7	6.00	END	645.00	643.09
*CLEAN OUT LIDS TO BE WATER TIGHT.				

PLANTING SOIL CRITERIA	
PH RANGE	5.2 - 7.0
ORGANIC MATTER	1.5 - 4.0%
MAGNESIUM	35 LBS. PER ACRE, MINIMUM
PHOSPHORUS P2O2	75 LBS. PER ACRE, MINIMUM
POTASSIUM K20	85 LBS. PER ACRE, MINIMUM
SOLUBLE SALTS	NOT TO EXCEED 500 PPM
CLAY	0-25% BY VOLUME
SILT	30-55% BY VOLUME
SAND	35-60% BY VOLUME

LEGEND

- SET/FOUND MONUMENTATION
- TEMPORARY BENCHMARK
- SURVEYED BOUNDARY
- UTILITY EASEMENT LINE
- SETBACK LINE
- OVERHEAD ELECTRIC LINE
- UTILITY POLE
- STREET LIGHT
- LIGHT POLE
- ELECTRIC METER
- GUY-WIRE
- TELEPHONE PEDESTAL
- UNDERGROUND TELEPHONE LINE
- SEWER LINE
- STORM MANHOLE/CATCH BASIN
- MANHOLE
- SANITARY SEWER MANHOLE
- WATER LINE
- IRRIGATION LINE
- FIRE HYDRANT
- WATER VALVE
- MAIL BOX
- COMMUNICATION PEDESTAL
- SIGNPOST
- SEWER – UTILITY LOCATE FLAG/PAINT
- WATER – UTILITY LOCATE FLAG/PAINT
- METAL FENCE
- WOOD FENCE
- T.P.=1317.92 TOP OF PAVEMENT
- T.C.=1318.42 TOP OF CURB
- T.W.=1318.10 TOP OF SIDEWALK
- G.R.=1320.65 FINISHED GROUND
- T.I.=1310.30 TOP OF INLET
- FL.=1308.88 FLOW LINE
- SPILL CURB

HATCHING LEGEND

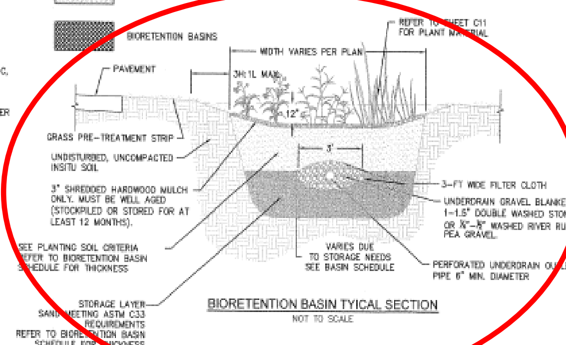
- HEAVY DUTY ASPHALT
- LIGHT DUTY ASPHALT
- BIORETENTION BASINS

CONSTRUCTION SEQUENCING

1. INSTALL SILT FENCE AND/OR OR OTHER APPROPRIATE TEMPORARY EROSION CONTROL DEVICES TO PREVENT SEDIMENT FROM LEAVING OR ENTERING THE PRACTICE DURING CONSTRUCTION.
2. ALL DOWN-GRADIENT PERIMETER SEDIMENT CONTROL BMP'S MUST BE IN PLACE BEFORE ANY UP GRADIENT LAND DISTURBING ACTIVITY BEGINS.
3. PERFORM CONTINUOUS INSPECTIONS OF EROSION CONTROL PRACTICES.
4. INSTALL UTILITIES (WATER, SANITARY SEWER, ELECTRIC, PHONE, FIBER OPTIC, ETC) PRIOR TO SETTING FINAL GRADE OF BIORETENTION DEVICE.
5. ROUGH GRADE THE SITE. IF BIORETENTION AREAS ARE BEING USED AS TEMPORARY SEDIMENT BASINS LEAVE A MINIMUM OF 3 FEET OF COVER OVER THE PRACTICE TO PROTECT THE UNDERLYING SOILS FROM CLOGGING.
6. PERFORM ALL OTHER SITE IMPROVEMENTS.
7. SEED AND MULCH ALL AREAS AFTER DISTURBANCE.
8. CONSTRUCT BIORETENTION DEVICE UPON STABILIZATION OF CONTRIBUTING DRAINAGE AREA.
9. IMPLEMENT TEMPORARY AND PERMENATE EROSION CONTROL PRACTICES.
10. PLANT AND MULCH BIORETENTION DEVICE.
11. REMOVE TEMPORARY EROSION CONTROL DEVICES AFTER THE CONTRIBUTING DRAINAGE AREA IS ADEQUATELY VEGETATED.

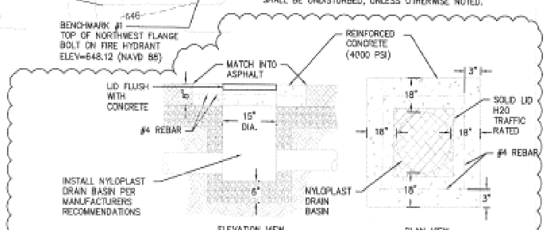
GENERAL NOTES

1. IN THE EVENT THAT SEDIMENT IS INTRODUCED INTO THE BMP DURING OR IMMEDIATELY FOLLOWING EXCAVATION, THIS MATERIAL SHALL BE REMOVED FROM THE PRACTICE PRIOR TO CONTINUING CONSTRUCTION.
2. GRADING OF BIORETENTION DEVICES SHALL BE ACCOMPLISHED USING LOW-COMPACTION EARTH-MOVING EQUIPMENT TO PREVENT COMPACTION OF UNDERLYING SOILS.
3. ALL SUB MATERIALS BELOW THE SPECIFIED BIORETENTION DEPTH (ELEVATION) SHALL BE UNDISTURBED, UNLESS OTHERWISE NOTED.



BIORETENTION BASIN TYCIAL SECTION

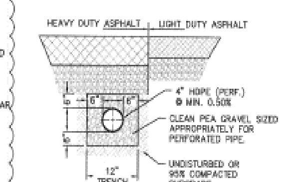
NOT TO SCALE



NYLOPLAST DRAIN BASIN CONCRETE COLLAR DETAIL

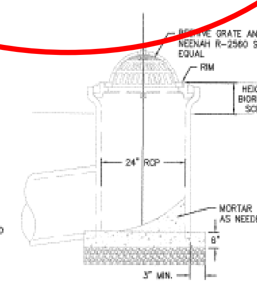
NOT TO SCALE

NOTE:
INSTALL PER MANUFACTURERS RECOMMENDATIONS



PARKING LOT UNDER DRAIN DETAIL

NOT TO SCALE



BEEHIVE GRATE ON CLEAN-OUT DETAIL

NOT TO SCALE

811 Know what's below. Call before you dig.

OA PROJECT #013-0987

OLSSON ASSOCIATES

STIPULATION FOR REUSE

FAMILY DOLLAR STORE
5377 BROADWAY (INDIANA 53)
MERRILLVILLE, INDIANA

JOB NUMBER: 2012.0491

ISSUE BLOCK

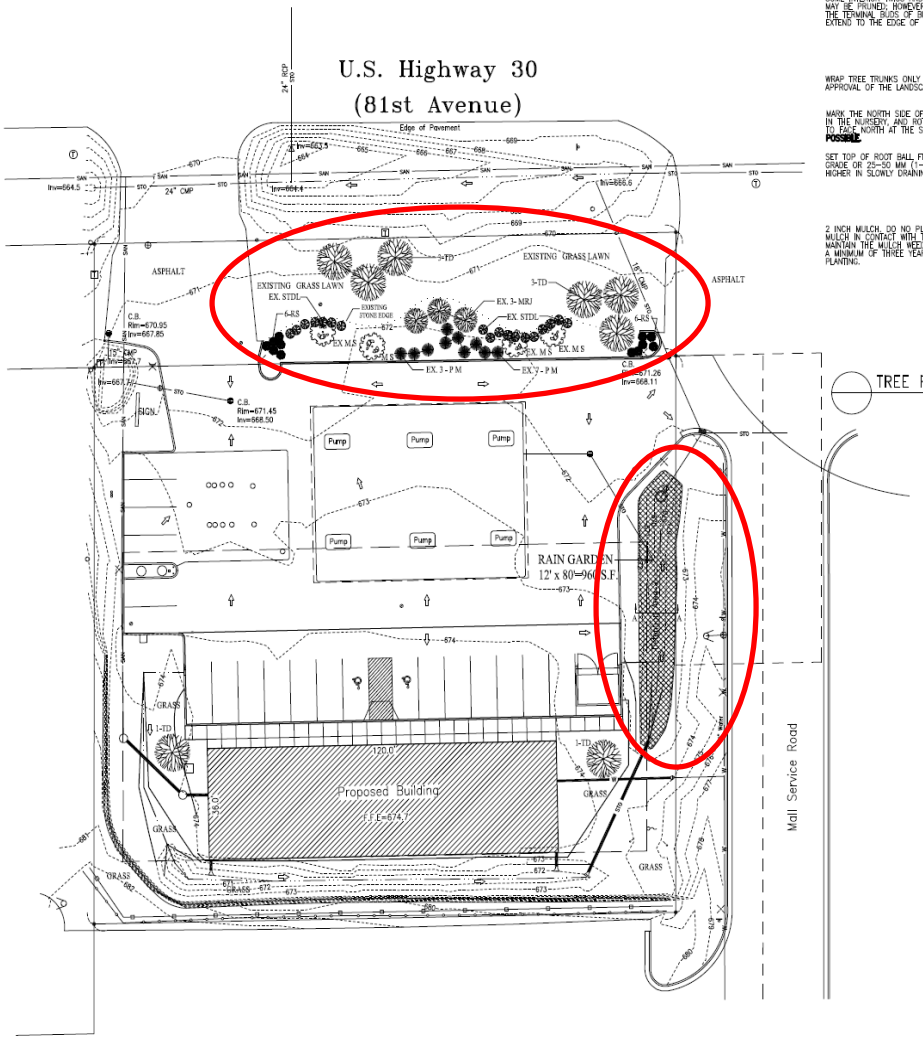
1	06.18.13	CITY CMNTS

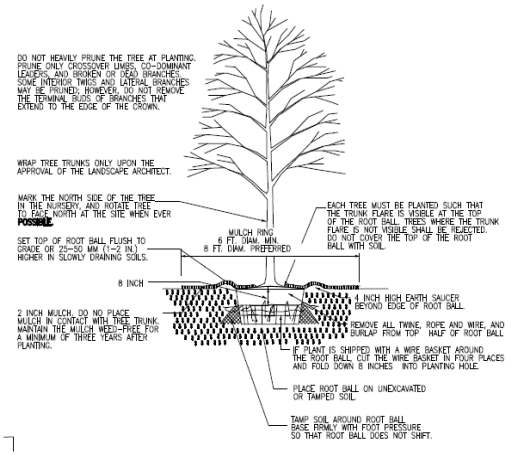
CHECKED BY:	JKE
DRAWN BY:	RPJ
PROTO CYCLE:	2012-04
DOCUMENT DATE:	05.07.2013

STORMWATER PLAN

SHEET: C7

LUKE OIL





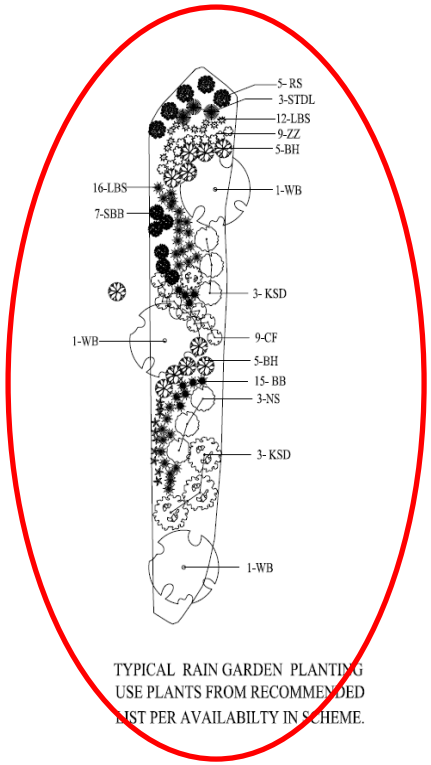
TREE PLANTING DETAIL – B&B TREES IN ALL SOIL TYPES

PLANT LEGEND:

KEY	Size Cond.	BOTANICAL NAME	COMMON NAME
MS		Malus species Sargenti	Sargent Dwarf Crabapple
MRJ		Malus species Red Jade	Red Jade Crabapple
PM		Pinus mugo mughus	Compact Mugo Pine
STDL		Hemerocallis ' Stella D'Oro'	Stella D'Oro Daylilly
RS	1 gal.	Rosa 'Radrazz' Knock Out	Knock Out Red Rose
TD	2"BB	Taxodium dstichum	Bald Cypress

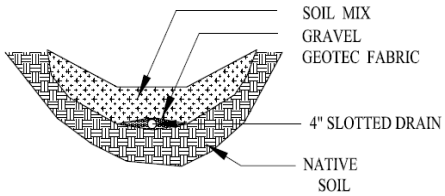
RAIN GARDEN PLANT LEGEND:

KEY	Size Cond.	BOTANICAL NAME	COMMON NAME
GRASSES:			
BBS		Andropogon gerardii	Big Bluestem
LBS		Schizachyrium scoparium	Little Bluestem
SWG		Panicum virgatum	Switchgrass
ING		Sorghastrum nutans	Indiangrass
ISO		Chasmanthium latifolium	Inland Sea Oats
BJ		Calamagrostis canadensis	Bluejoint
BB		Andropogon glomeratus	Bushy Bluestem
FS		Carex crinita	Fringed Sedge
SHRUBS:			
CB		Cephalanthus occidentalis	Common Buttonbush
KSD		Cornus sericea 'Kelseyi'	Kelsey's Dwarf Red-Osier Dogwood
BH		Gaylussacia baccata	Black Huckle Berry
WB		Ilex verticillata	Common Winter Berry
NS		Lindera benzoin	Northern Spicebush
Herbaceous Plants:			
ZZ		Iris brevicaulis	Zigzag Iris
CF		Lobellia cardinalis	Cardinal Flower
SBB		Monarda didyma	Scarlet Bee Balm
WSW		Phlox maculata	Wild Sweet William



TYPICAL RAIN GARDEN PLANTING
USE PLANTS FROM RECOMMENDED LIST PER AVAILABILTY IN SCHEME.

SOIL MIX:
30% SHARP SAND
50% TOPSOIL
20% COMPOST



RAIN GARDEN DETAIL
CROSS SECTION AA

NORTH

20 10 0 20
SCALE – FEET


LAKE COUNTY PUBLIC LIBRARY
RAIN GARDEN

LAKE COUNTY PUBLIC LIBRARY

RAIN GARDEN

Simple rain gardens are generally 3 to 6 inch deep, saucer-shaped depressions that are planted with moisture-loving native plants.

Rain gardens provide many environmental benefits:

- Flood Control
- Filtering Stormwater Pollution
- Water-cooling
- Groundwater Recharge

How many of these can you find?


Meadow Sedge


Franks Sedge


Little Blue Stem


Prairie Dropseed


Panicled Aster


Purple Coneflower


Blue Flag Iris


Prairie Blazing Star

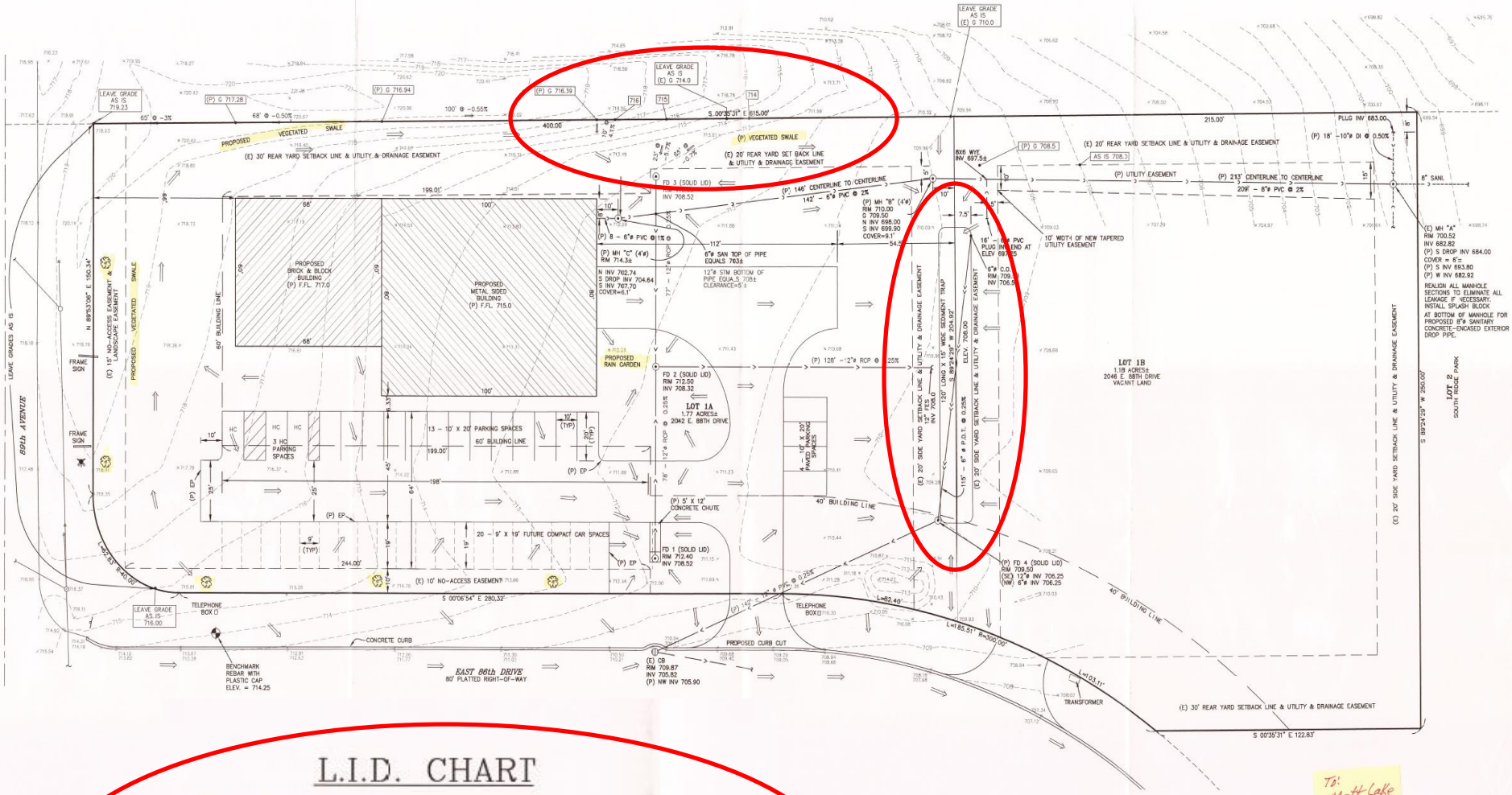

Sweet Black-Eyed Susan


Smooth Prairie Ironweed

KEOUGH MECHANICAL

KEOUGH ENTERPRISES

PROPOSED L.I.D. SKETCH PLAN



L.I.D. CHART

LID–114 5 TREES X 5 POINTS/TREE = 25 POINTS

PC–101 1600 SFT RAIN GARDEN = 20 POINT/100 SFT = 320 POINTS

PC–111 500 LFT VEGETATED SWALES = 10 POINTS/100 LFT = 50 POINTS

PROVIDED L.I.D. POINTS = 395

TOTAL DISTURBED AREA = 2.07 ACRES

TOTAL REQUIRED L.I.D. POINTS = 2.07 ACRES X 100 POINTS/ACRE = 207 POINTS

VICINITY MAP
NOT TO SCALE

LEGEND

- SITE BENCHMARK
- CATCH BASIN
- MAN HOLE
- FLOW
- DIRECTIONAL SURFACE DRAINAGE
- C.O. CLEANOUT
- (P) PERFORATED DRAIN TILE
- (E) STORM
- (P) STORM
- (P) SANITARY
- (E) SANITARY
- GROUND ELEVATION CONTOUR
- EXISTING SPOT ELEVATION
- (E) EXISTING
- (P) PROPOSED
- G GRADE ELEVATION
- TW TOP OF WALK
- EP EDGE OF PAVEMENT
- HC HANDICAPPED PARKING
- L.I.D. LOW IMPACT DEVELOPMENT
- F.E.S. FLARED END SECTION
- FRENCH DRAIN (FD)
- TREE (3 PLACES)

DESCRIPTION:

LOTS 1A AND 1B IN KEOUGH ENTERPRISES, AN ADDITION TO THE TOWN OF MERRILLVILLE, AS SHOWN IN PLAT BOOK 107, PAGE 08, IN THE OFFICE OF THE RECORDER OF LAKE COUNTY, INDIANA.

GRAPHIC SCALE

(IN FEET)
1 inch = 20 ft.

BASIS OF BEARINGS: PER THE RECORD PLAT OF SOUTH RIDGE PARK, AN ADDITION TO MERRILLVILLE, PLAT BOOK 94, PAGE 71.

To: Matt Lake

G. L. GRANT REGISTERED No. 18341 STATE OF INDIANA PROFESSIONAL ENGINEER

FILE: \13658\SITE PLAN R1.DWG
PLOT SCALE: 1"=20'

KEOUGH ENTERPRISES
PROPOSED L.I.D. SKETCH PLAN

DRAWING NUMBER C–1

SHEET: 1 OF: 1

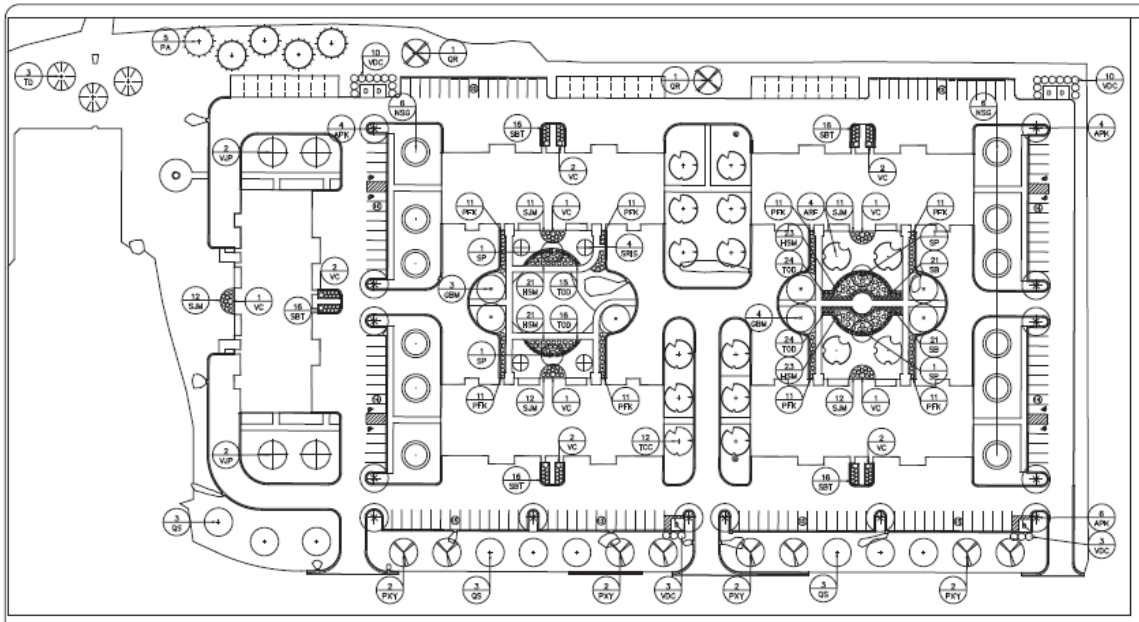
JOB NO. 513658
SECTION: 26-35-8

Plumb Tuckett & Associates
SURVEYORS • ENGINEERS
64 West 67th Place · Merrillville, IN 46410
(219) 736-0555 · FAX (219) 769-0178
www.plumbtuckett.com

KEOUGH ENTERPRISES
PROPOSED L.I.D. SKETCH PLAN
MERRILLVILLE, INDIANA

REVISIONS

DRAWN BY: MLP/MS
DATE: 5/23/14
CHECKED BY: GLG
DATE: 5/23/14

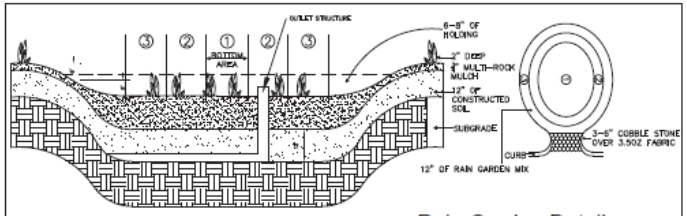


PLANT LIST

Symbol	Botanical Name	Common Name	Size	Qty
Trees				
APK	Acer platenoides 'Crimson King'	Crimson King Maple	2"	14
ARF	Acer rubrum 'Frank Jr'	Redpointe Maple	2"	4
GBM	Ginkgo biloba 'Magyar'	Magyar Ginkgo	2"	3
NSG	Nyssa sylvatica 'Green Gable'	Green Gable Black Gum	2"	12
PA	Picea abies	Norway Spruce	6'	3
PKY	Prunus x yedoensis	Yoshino Cherry	2"	8
QR	Quercus rubra	Red Oak	2"	5
QS	Quercus 'Shumardii'	Shumard Oak	2"	9
SP	Stewartia pseudocamellia	Japanese Stewartia	2"	3
SRIS	Syringa reticulata Ivory Silk	Ivory Silk Lilac	2"	4
TCC	Tilia cordata 'Chancole'	Chancellor Linden	2"	12
TD	Taxodium distichum	Bald Cypress	2"	3
UJP	Ulmus japonica x pumilla 'New Horizon'	New Horizon Elm	2"	4
Shrubs				
HSM	Hydrangea serrata 'Mekzo'	Hydrangea Serrata Tuff Stuff	#3	88
PFK	Potentilla fruitiicosa 'Kuplinga'	Potentilla Happy Face Pink	#3	80
SB	Spirea 'Ballcamo'	Spirea First Editions Sundrop	#3	42
SBT	Spirea beautifolia	Tor Birchleaf Spirea	#3	80
SJM	Spirea japonica 'Minspi'	Spirea Painted Lady	#3	58
TOD	Thuja occidentalis 'Danica'	Danica Arborvitae	#3	78
VC	Viburnum cayuga	Cayuga Viburnum	24"	15
VDC	Viburnum dentatum 'Christom'	Viburnum Blue Muffin	#5	20

Landscape Requirements

Calculations	Total Linear Feet (LF) or Square Feet (SF)	Trees Required	Trees Provided	Shrubs Required	Shrubs Provided
Interior Landscaping					
1 Tree or 5 Shrubs per 800 SF	80,595 SF	100	5	500	475
Parkway					
1 Tree per 40 LF	550 LF	14	14		
Parkline Lot					
1 Tree per 2,000 SF. No more than 25 spaces in a continuous row	138,686 SF	69	69		



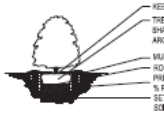
Rain Garden Detail

1. BOTTOM AREA INUNDATED 24+
Yellow fox Sedge Plugs
Franks Sedge Plugs
Blue Flag Iris Plugs
Monkey Flower Plugs
—Spaced 12" on Center

2.INUNDATED 2–24 HRS
Switch Grass Plugs
Prairie Dropseed Plugs
Marsh Milkweed Plugs
Meadow Sedge Plugs
Golden Alexander Plugs
—Spaced 12"on Center

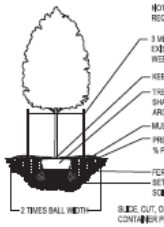
3. INUNDATED LESS THAN 2 HOURS
Little Blue Stem Plugs
Brome Hummock Sedge Plugs
Riddell's Golden Rod Plugs
Purple Cone Flower Plugs
Cardinal Flower Plugs
—Spaced 12" on Center

LOCATE ALL UNDERGROUND UTILITIES PRIOR TO DIGGING. SHRUB PIT WIDTH TO BE TWO TIMES THE WIDTH OF THE ROOT BALL. PRUNE OFF ALL DEAD, BROKEN OR SCARRED BRANCHES, AND SHAPE PRUNE AS DIRECTED BY THE LANDSCAPE ARCHITECT. LOCATE ROOT FLARE IN ROOT BALL AND SET SHRUB HEIGHT SO THAT ROOT FLARE IS FLUSH OR SLIGHTLY HIGHER THAN FINISH GRADE DEPENDING ON EXISTING SOIL CONDITIONS. WATER IN THE PLANTING MIX THOROUGHLY, WHILE KEEPING THE SHRUB PLUMB. STRAIGHTEN SHRUB IF SETTLING OCCURS. MULCH LIMITS FOR SHRUBS TO EXTEND TO ALL EDGES OF PLANTING BEDS, SEE PLANS FOR BED LAYOUTS.



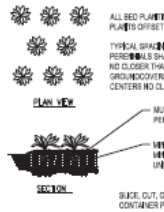
1 SHRUB PLANTING DETAIL
NOT TO SCALE

LOCATE ALL UNDERGROUND UTILITIES PRIOR TO DIGGING. TREE PIT WIDTH TO BE Two TIMES THE WIDTH OF THE ROOT BALL. PRUNE OFF ALL DEAD, BROKEN OR SCARRED BRANCHES, AND SHAPE PRUNE AS DIRECTED BY THE LANDSCAPE ARCHITECT. LOCATE ROOT FLARE IN ROOT BALL AND SET TREE HEIGHT SO THAT ROOT FLARE IS FLUSH OR SLIGHTLY HIGHER THAN FINISH GRADE DEPENDING ON EXISTING SOIL CONDITIONS. WATER IN THE PLANTING MIX THOROUGHLY, WHILE KEEPING THE TREE PLUMB. STRAIGHTEN TREE IF SETTLING OCCURS.



2 DECIDUOUS & EVERGREEN TREE PLANTING DETAIL
NOT TO SCALE

LOCATE ALL UNDERGROUND UTILITIES PRIOR TO DIGGING. AMEND PLANTING BED SOIL WITH COMPOST PRIOR TO PLANT INSTALLATION. BED HEIGHT IS TO BE 2" ABOVE FINISH GRADE AND WELL DRAINED. MULCH LIMITS FOR PERENNIAL AND GROUNDCOVER BEDS TO EXTEND TO ALL EDGES OF THE BEDS, SEE PLANS FOR BED LAYOUTS.



3 PERENNIAL, GROUNDCOVER, AND ANNUAL PLANTING DETAIL
NOT TO SCALE

	Revisions:	Date

HUBINGER
Landscaping
Corp.
210 East 113th Avenue
Crown Point, Indiana
Phone: 219–662–9911
www.hubingers.com

L-1.0

Drawn By: JBK / NJB
Date: 6-20-18
Scale: 1:30

LID Compliance Summary Worksheet (Table 6-2)

Project Information

Project Name	Brookstone Estates Phase 2 (North)	Developer/ Owner	Milt Petersen
Plan Preparer	Ryan Marovich	Developer/Owner Address	7507 Taft St., Suite 4, Merrillville
Plan Preparer Telephone	(219) 281-4067	Developer/Owner Telephone	(219) 741-7584

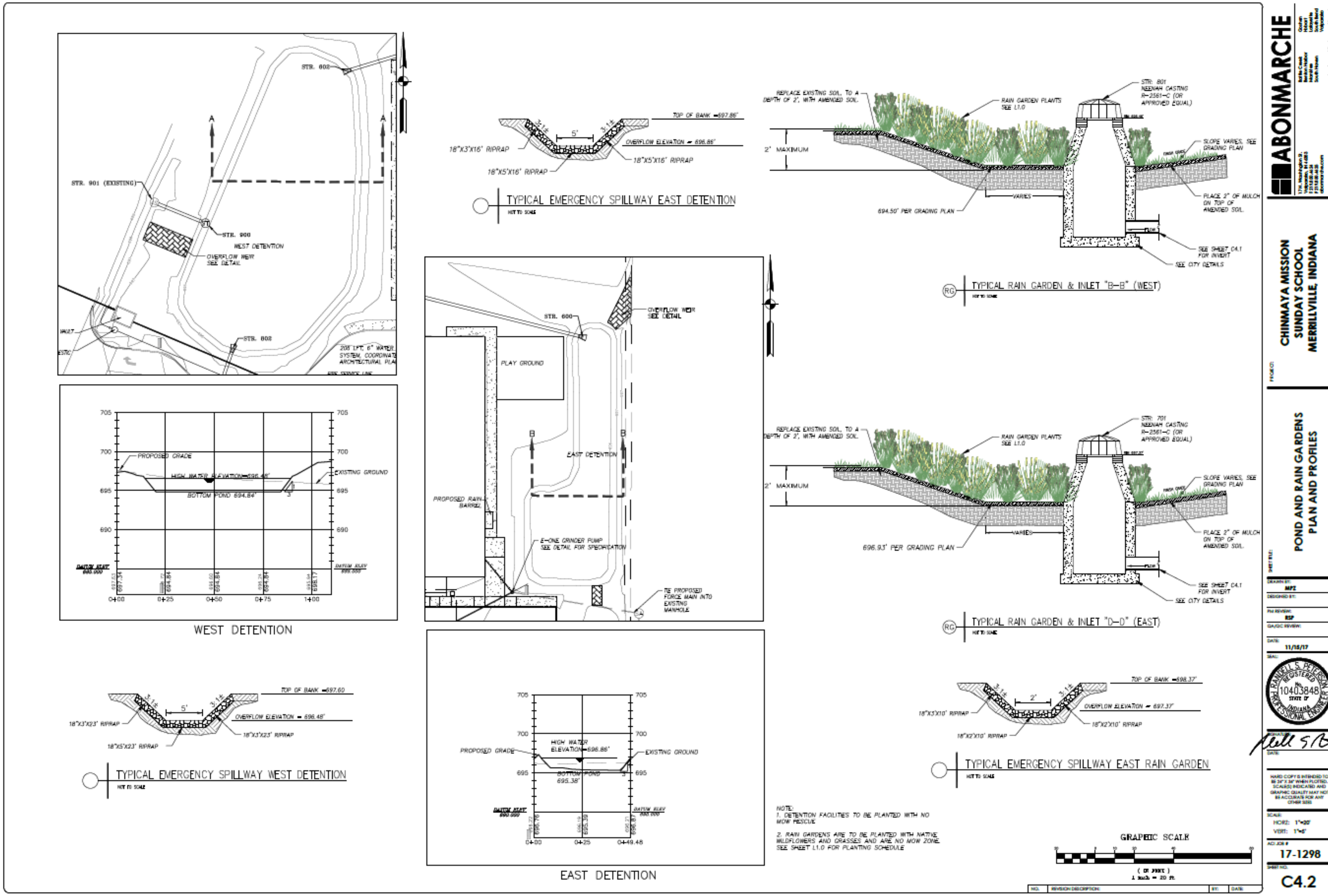
This worksheet is a tool to allow both the Municipality and the Developer/Owner to reference various measures implemented within the development in order to meet the development's Storm Water Management Ordinance requirements.

Site Specific Information

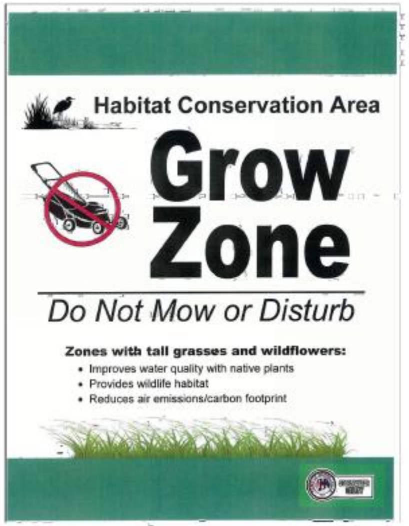
Total Site Area (ac)	9.34
Total Disturbed Area (ac)	11.6
Total Required LID Points (disturbed acres x 100)	1,160

LOW IMPACT DEVELOPMENT BMP	Quantity of BMP	LID Points	Proposed Quantity	Proposed LID Points
Bio-Retention Facility (Rain Garden)	100sf	20	1,570 sq. ft.	314
Catch Basin Inserts	1ea	10		
Cistern/Dry Well	1ea	10		
Constructed Wetland	100sf	20		
Dry Extended Detention Basins	100sf	20		
Infiltration Basin	100sf	10		
Infiltration Trench	100sf	10		
Media Filtration	1ea	10		
Storm Drain Inserts / Hydrocarbon Filters	1ea	10		
Vegetated Filter Strips	100sf	10		
Vegetated Swales	100 linear ft.	10	550 l.f.	55
Wet Ponds/Retention Basins	100sf	20	11,780 sq. ft.	2,356
Pervious Pavement with Infiltration Bed	100sf	10		
Vegetated Roof	100sf	15		
Level Spreaders	100 linear ft	15		
Hydrodynamic Separator	1ea	50		
Two Stage Ditch	100 linear ft	15		
Riparian Buffer Restoration	100sf	5		
Wetland Restoration/Creation	100sf	20		
Cluster Design	1ac	10		
Open Space Conservation	100sf	10		
Sensitive Area Protection	100 linear ft.	10		
LEED Certification	1ac	20		
Native Revegetation	100sf	10		
Stormwater Disconnectivity	1ea	5-commercial 1-residential		
Additional Tree Installation	1ea	5		
Design for LEED Certification	100sf	20		
Emerging Technology	variable	variable		
OTHER-	variable	variable		
OTHER-	variable	variable		
		Total Proposed LID Points	2,725	

Note: Not all LID measures are necessary or appropriate for every site. It is imperative that proper site assessments and due diligence is completed by the Developer and/or Engineer prior to design.

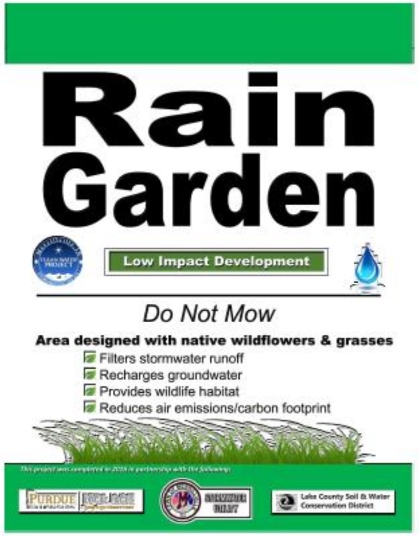


WEST DETENTION
TYPICAL EMERGENCY SPILLWAY WEST DETENTION
TOP OF BANK =697.60
OVERFLOW ELEVATION = 696.48'
18"X3'X23' RIPRAP
18"X5'X23' RIPRAP
TYPICAL EMERGENCY SPILLWAY EAST DETENTION
TOP OF BANK =697.86'
OVERFLOW ELEVATION = 696.86'
18"X3'X16' RIPRAP
18"X5'X16' RIPRAP
EAST DETENTION
HIGH WATER ELEVATION=696.86'
BOTTOM POND 695.38'
PROPOSED GRADE
EXISTING GROUND
STR. 901 (EXISTING)
STR. 900
WEST DETENTION
OVERFLOW WEIR SEE DETAIL
STR. 600
PLAY GROUND
EAST DETENTION
PROPOSED RAIN BARREL
E-ONE GRINDER PUMP SEE DETAIL FOR SPECIFICATION
TIE PROPOSED FORCE MAIN INTO EXISTING MANHOLE
TYPICAL RAIN GARDEN & INLET "B-B" (WEST)
TYPICAL RAIN GARDEN & INLET "D-D" (EAST)
REPLACE EXISTING SOIL, TO A DEPTH OF 2', WITH AMENDED SOIL.
RAIN GARDEN PLANTS SEE L1.0
NEENAH CASTING R-2561-C (OR APPROVED EQUAL)
2' MAXIMUM
SLOPE VARIES, SEE GRADING PLAN
PLACE 2" OF MULCH ON TOP OF AMENDED SOIL.
694.50' PER GRADING PLAN
696.93' PER GRADING PLAN
SEE SHEET C4.1 FOR INVERT
SEE CITY DETAILS
TYPICAL EMERGENCY SPILLWAY EAST RAIN GARDEN
TOP OF BANK =698.37'
OVERFLOW ELEVATION = 697.37'
NOTE:
1. DETENTION FACILITIES TO BE PLANTED WITH NO MOW FESCUE
2. RAIN GARDENS ARE TO BE PLANTED WITH NATIVE WILDFLOWERS AND GRASSES AND ARE NO MOW ZONE. SEE SHEET L1.0 FOR PLANTING SCHEDULE
GRAPHIC SCALE
ABONMARCHE
CHINMAYA MISSION SUNDAY SCHOOL MERRILLVILLE, INDIANA
POND AND RAIN GARDENS PLAN AND PROFILES
11/15/17
17-1298
C4.2

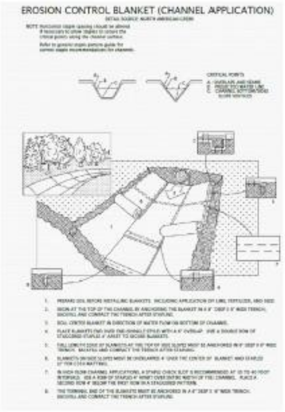


NO MOW SIGN
–NOT TO SCALE–

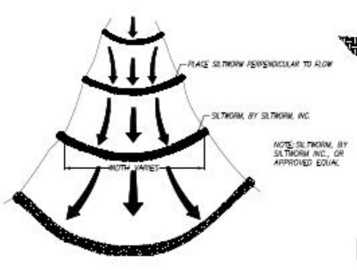
SELF MONITORING DETAILS
–NOT TO SCALE–



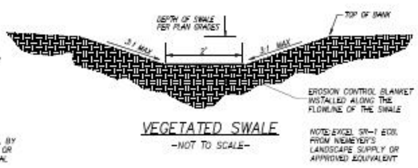
RAIN GARDEN SIGN
–NOT TO SCALE–



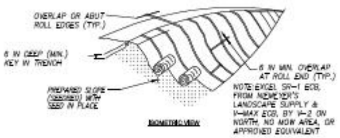
EROSION CONTROL BLANKET WITHIN SWALE
–NOT TO SCALE–



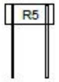
SILT DIKE/ CHECK DAM
–NOT TO SCALE–



VEGETATED SWALE
–NOT TO SCALE–

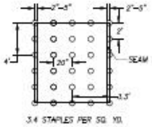


EROSION CONTROL BLANKET
–NOT TO SCALE–



1. Post signed Rule 5 NOI Permit # at location visible to the public.
2. Ensure that the Rule 5 permit is on the NOI.
3. Ensure that there is a note of where a complete set of plans are located.
4. Ensure that the posting is waterproof.
5. Posting shall include all other applicable permits.
6. Posting shall be located as shown on the construction plans, near the main entrance of the construction site.

PERMIT POSTING DETAILS
–NOT TO SCALE–



EROSION CONTROL BLANKET STAPLE PATERN DETAIL
–NOT TO SCALE–

CONSTRUCTION SPECIFICATIONS FOR EROSION CONTROL BLANKET

1. USE MATTING THAT HAS A DESIGN VALUE FOR SHEAR STRESS EQUAL TO OR HIGHER THAN THE SHEAR STRESS DESIGNATED ON APPROVED PLANS.
2. USE TEMPORARY SOIL STABILIZATION MATTING MADE OF DEGRADABLE (LASTS 6 MONTHS MINIMUM) NATURAL OR MAN-MADE FIBERS (MOSTLY ORGANIC). MAT MUST HAVE UNIFORM THICKNESS AND DISTRIBUTION OF FIBERS THROUGHOUT AND BE SMOLDER RESISTANT. CHEMICALS USED IN THE MAT MUST BE NON-LEACHING AND NON-TOXIC TO VEGETATION AND SEED GERMINATION AND NON-INJURIOUS TO THE SKIN. IF PRESENT, NETTING MUST BE EXTRUDED PLASTIC WITH A MAXIMUM MESH OPENING OF 2x2 INCHES AND SUFFICIENTLY BONDED OR SEWN ON 2 INCH CENTERS ALONG LONGITUDINAL AXIS OF THE MATERIAL TO PREVENT SEPARATION OF THE NET FROM THE PARENT MATERIAL.
3. SECURE MATTING USING STEEL STAPLES, WOOD STAKES, OR BIODEGRADABLE EQUIVALENT. STAPLES MUST BE "U" OR "T" SHAPED STEEL WIRE HAVING A MINIMUM GAUGE OF NO. 11 AND NO. 8 RESPECTIVELY. "U" SHAPED STAPLES MUST AVERAGE 1 TO 1½ INCHES WIDE AND BE A MINIMUM OF 6 INCHES LONG. "T" SHAPED STAPLES MUST HAVE A MINIMUM 8 INCH MAIN LEG, A MINIMUM 1 INCH SECONDARY LEG, AND A MINIMUM 4 INCH HEAD. WOOD STAKES MUST BE ROUGH-SAWN HARDWOOD,
12 TO 24 INCHES IN LENGTH, 1x3 INCH IN CROSS SECTION, AND WEDGE SHAPED AT THE BOTTOM.
4. PERFORM FINAL GRADING, TOPSOIL APPLICATION, SEEDBED PREPARATION, AND PERMANENT SEEDING IN ACCORDANCE WITH SPECIFICATIONS. PLACE MATTING WITHIN 48 HOURS OF COMPLETING SEEDING OPERATIONS UNLESS END OF WORKDAY STABILIZATION IS SPECIFIED ON THE APPROVED EROSION & SEDIMENT CONTROL PLAN.
5. UNROLL MATTING DOWNSLOPE. LAY MAT SMOOTHLY AND FIRMLY UPON THE SEEDED SURFACE. AVOID STRETCHING THE MATTING.
6. OVERLAP OR ABUT ROLL EDGES PER MANUFACTURER RECOMMENDATIONS. OVERLAP ROLL ENDS BY
6 INCHES (MINIMUM), WITH THE UPSLOPE MAT OVERLAPPING ON TOP OF THE DOWNSLOPE MAT.
7. KEY IN THE UPSLOPE END OF MAT 6 INCHES (MINIMUM) BY DIGGING A TRENCH, PLACING THE MATTING ROLL END IN THE TRENCH, STAPLING THE MAT IN PLACE, REPLACING THE EXCAVATED MATERIAL, AND TAMPING TO SECURE THE MAT END IN THE KEY.
8. STAPLE/STAKE MAT IN A STAGGERED PATTERN ON 4 FOOT (MAXIMUM) CENTERS THROUGHOUT AND
2 FOOT (MAXIMUM) CENTERS ALONG SEAMS, JOINTS, AND ROLL ENDS.
9. ESTABLISH, MAINTAIN AND INSPECT VEGETATION SO THAT LOCAL REQUIREMENTS FOR ADEQUATE VEGETATIVE ESTABLISHMENT ARE CONTINUOUSLY MET.

NO.	REVISION DESCRIPTION	BY:	DATE

ABONMARCHE

PROJECT: CHINMAYA MISSION SUNDAY SCHOOL MERRILLVILLE, INDIANA

SHEET TITLE: STORM WATER POLLUTION PREVENTION PLAN DETAILS

DRAWN BY: MPZ
DESIGNED BY:
PM REVIEW: RSP
QA/QC REVIEW:
DATE: 11/15/17
SEAL: RANDELL S. PETERSON REGISTERED No. 10403848 STATE OF INDIANA PROFESSIONAL ENGINEER
SIGNATURE:
DATE:

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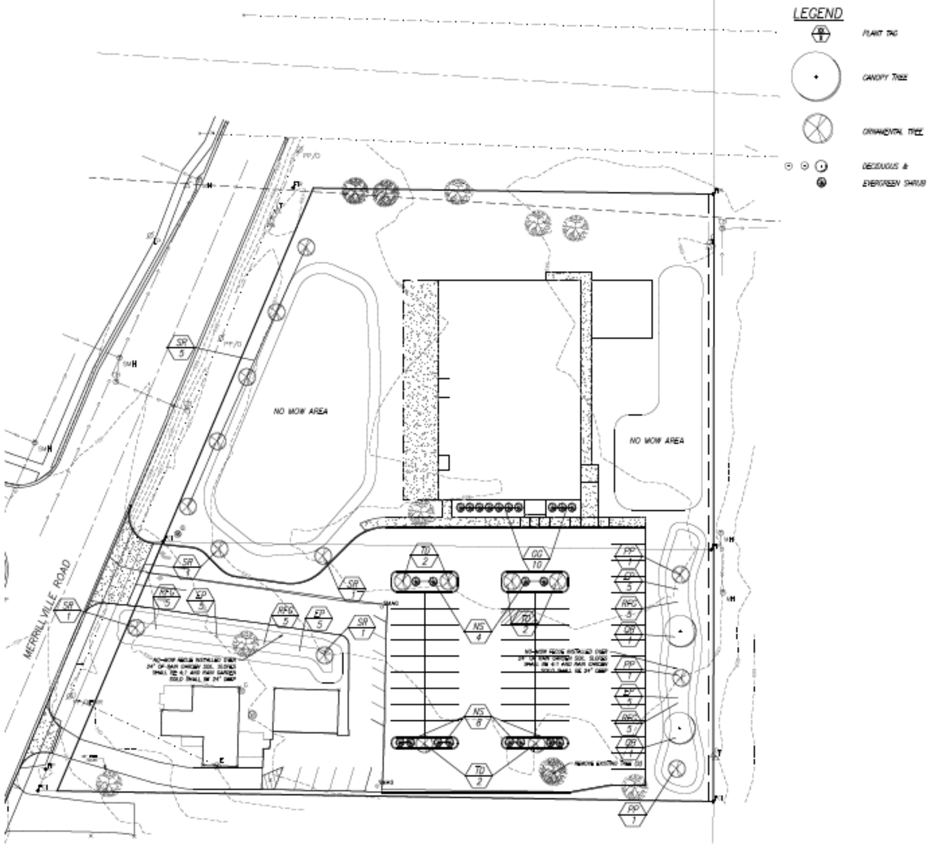
SCALE:
HORZ:
VERT:
ACI JOB #: 17-1298
SHEET NO. C5.3

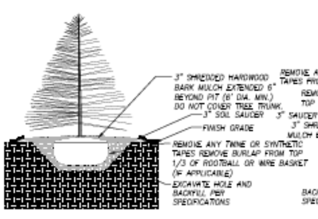


PLANT SCHEDULE

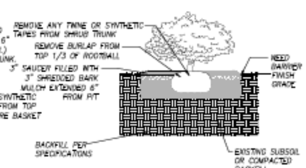
KEY	BOTANICAL NAME	COMMON NAME	QUANTITY	SIZE	CONDITION	REMARKS
DECIDUOUS SHADE TREES						
PP	Poplus	Superior Hybrid Poplar	3	2.5" Cal.	B & B	–
OB	Quercus bicolor	Swamp White Oak	2	2.5" Cal.	B & B	
			5	Total		
UNDERSTORY/ ORNAMENTAL TREES						
SR	Syringa Reticulata	Japanese Tree Lilac	9	1.5" Cal.	B & B	
TD	Taxodium distichum	Bald Cypress	6	1.5" Cal.	B & B	
			15	Total		
DECIDUOUS/EVERGREEN SHRUBS						
GG	Buxus 'Green Gem'	Green Gem Boxwood	10	24" Spread	B & B	–
NS	Buxus Sempervirens	Boxwood Northstar	12	24" Hgt.	B & B	
			24	Total		
PERENNIALS						
EP	Echinacea purpurea	Purple Coneflower	20	18" – O.C.	B & B	–
RFG	Rudbeckia f. 'Goldsturm'	Goldsturm Black-Eyed Susan	20	18" – O.C.	B & B	
			40			

Note: Plants specified are minimum size shown; larger material and rootball conditions are acceptable.

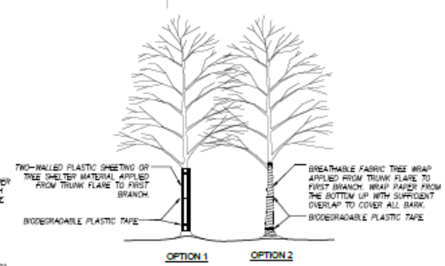
1. IN CASE OF DISCREPANCIES BETWEEN THE PLAN AND THE PLANT LIST, THE PLAN SHALL DICTATE AND THE PROJECT DESIGNER/LANDSCAPE ARCHITECT IS TO BE NOTIFIED.
2. IF SPECIFIED PLANT MATERIALS ARE NOT AVAILABLE, THE CONTRACTOR SHALL NOTIFY THE DESIGNER PRIOR TO THE BID IN WRITING FOR SUBSTITUTIONS TO BE APPROVED. ALL PLANTS SHALL BE INSPECTED AND TAGGED WITH PROJECT I.D. AT NURSERY OR CONTRACTOR'S OPERATIONS PRIOR TO MOVING TO THE JOB SITE. SPECIMENS MAY BE INSPECTED, APPROVED OR REJECTED ON THE JOB SITE BY DESIGNER.
3. FINAL PLACEMENT OF PLANT MATERIALS, ETC., SHALL BE APPROVED BY DESIGNER BEFORE PLANTING OPERATIONS ARE TO PROCEED. ALL TREE LOCATIONS SHALL BE MARKED WITH A WOOD STAKE INDICATING VARIETY AND SIZE OF TREE. ALL GROUND COVER AND PLANTING BED LINES SHALL BE MARKED WITH HIGHLY VISIBLE PAINT LINESFOR REFERENCE. ALL STAKES AND TAGS SHALL BE REMOVED FOLLOWING PLANTING OPERATIONS DESIGNER RESERVES THE RIGHT TO ADJUST PLANT LOCATIONS ON THE SITE.
4. ALL PLANTS SHALL MEET OR EXCEED AMERICAN STANDARDS FOR NURSERY STOCK, 2004 EDITION, AS SET FORTH BY AMERICAN ASSOCIATION OF NURSERYMEN.
5. THE LANDSCAPE CONTRACTOR SHALL OBTAIN AND PAY FOR ALL PERMITS AND FEES THAT MAY BE REQUIRED FOR THEIR PORTION OF WORK.
6. FINAL GRADING AND ALL TOPSOIL PLACEMENT FOR LAWN AND PLANTING AREAS TO BE COMPLETED BY OTHERS PRIOR TO THE START OF LANDSCAPE WORK.
7. PLANTS AND ALL OTHER MATERIALS TO BE STORED ON SITE WILL BE PLACED WHERE THEY WILL NOT CONFLICT WITH OWNER OR CONSTRUCTION OPERATIONS. SITE SHALL BE MAINTAINED IN CLEAN CONDITION; PLANTS KEPT ONSITE SHALL BE WATERED DAILY AND ROOT ZONE THOROUGHLY WATERED WITHIN FOUR HOURS OF PLANTING.
8. AN APPROVED PRE-EMERGENT GRANULAR HERBICIDE SHALL BE APPLIED IN ALL PLANTING BEDS AT A RATE SPECIFIED BY MANUFACTURER FOR EACH PLANT VARIETY PRIOR TO INSTALLING MULCH.
9. ALL SHRUB PLANTING AREAS AND TREE RINGS TO BE COVERED WITH A 3" LAYER OF SHREDDED HARDWOOD BARK MULCH. ALL GROUNDCOVER AND PERENNIAL BEDS SHALL BE COVERED WITH 2" SHREDDED HARDWOOD BARK MULCH. CLEAN BEDS OF DEBRIS BEFORE INSTALLING MULCH. MULCH SOURCE SHALL BE APPROVED BY DESIGNER AND SHALL BE UNIFORM IN TEXTURE AND COLOR. NO MULCH WITH SANDUST OR DEBRIS, OR PROCESSED TREE TRIMMINGS, WILL BE ALLOWED. USE LANDSCAPE FABRIC WHERE APPROPRIATE FOR BEDS NOT CONTAINING SPREADING GROUNDCOVER.
10. LAWNS SHALL BE SEEDED OR SODDED FOLLOWING SCARIFYING, FINAL GRADING, FERTILIZING, AND RAKING. LAWNS SHALL BE FERTILIZED WITH 12-12-12 ANALYSIS FERTILIZER AT A RATE OF 10 LBS./1000 S.F. AND LIME APPLIED AS DICTATED BY SOILS TEST DONE BY CONTRACTOR PRIOR TO SEEDING. LAWNS TO BE SEEDED WITH MECHANICAL SPREADER AT A MINIMUM RATE OF 5 LBS./1000 S.F. APPLY SEED 1/2 ONE DIRECTION AND 1/2 PERPENDICULAR TO THE FIRST. LIGHTLY RAKE, ROLL WITH 200 LBS. ROLLER AND APPLY HYDROMULCH (NO STRAW MULCH) AFTER SEEDING.
11. WHERE NOTED ALL DISTURBED LAWN AREAS SHALL BE SEEDED OR SODDED. PERMANENT SEEDED LAWNS AND SODDED LAWNS SHALL BE SEED MIX AS APPROVED BY DESIGNER. SEED MIX SHALL CONSIST OF 34 POUNDS WABASH OR BARON KENTUCKY BLUEGRASS, 20 POUNDS OF KENTUCKY BLUEGRASS, 10 POUNDS PENNLAWN FESCUE, AND 26 POUNDS CERTIFIED FINE BLADED PERENNIAL RYEGRASS.
12. ALL LAWNS SHALL BE GUARANTEED TO HAVE FULL UNIFORM STAND OF ACCEPTABLE GRASS AT THE END OF ONE YEAR GUARANTEE PERIOD WITH NO BARE SPOTS COMPRISING MORE THAN 2% OF ANY LAWN AREA. ANY AREA SO NOTED TO BE SEEDED OR SODDED UNTIL AN ACCEPTABLE STAND OF GRASS IS ESTABLISHED.
13. BACK FILL FOR TREE AND SHRUB PLANTING SHALL BE 75% APPROVED TOPSOIL AND 25% APPROVED PEAT MOSS. TOP LAYER OF BACKFILL SHALL BE 100% EXISTING TOPSOIL. A 5-10-5 ANALYSIS OR APPROVED SUBSTITUTE SLOW RELEASE FERTILIZER SHALL BE INCORPORATED INTO BACK FILL AT APPROVED RATES.
14. FIELD-ADJUST FINAL LOCATIONS OF TREES AND OTHER PLANTS AS NEEDED TO AVOID UTILITY LINES, PIPES, SWALES OR SITE FEATURES.
15. ALL LANDSCAPE PLANTINGS TO BE MAINTAINED BY CONTRACTOR FOR 60 DAYS FOLLOWING FINAL INSPECTION BY DESIGNER OR OWNER'S REPRESENTATIVE. ALL SEEDED LAWNS SHALL BE MAINTAINED FOR 60 DAYS AND SODDED LAWNS FOR 30 DAYS FOLLOWING FINAL INSPECTION BY DESIGNER AFTER WRITTEN REQUEST FROM THE LANDSCAPE CONTRACTOR. MAINTENANCE TO INCLUDE WATERING, WEEDING, CULTIVATING, MULCHING, MOWING, AND ALL OTHER NECESSARY OPERATIONS REQUIRED FOR PROPER ESTABLISHMENT OF LAWNS AND PLANTINGS.
16. ALL PLANT MATERIAL SHALL BE GUARANTEED FOR A PERIOD OF ONE YEAR FOLLOWING FINAL INSPECTION BY DESIGNER. AT THE END OF THIS PERIOD, PLANT MATERIAL IDENTIFIED AS DEAD OR UNSATISFACTORY BY DESIGNER OR OWNER'S REPRESENTATIVE SHALL BE REPLACED AT NO ADDITIONAL CHARGE BY THE CONTRACTOR.



(L2) EVERGREEN TREE PLANTING DETAIL



(L4) SHRUB PLANTING DETAIL



APPLY THE PLASTIC SHEETING LOOSELY AROUND THE TRUNK TO LEAVE A 0.5 INCH GAP BETWEEN THE TRUNK AND THE SHEETING.

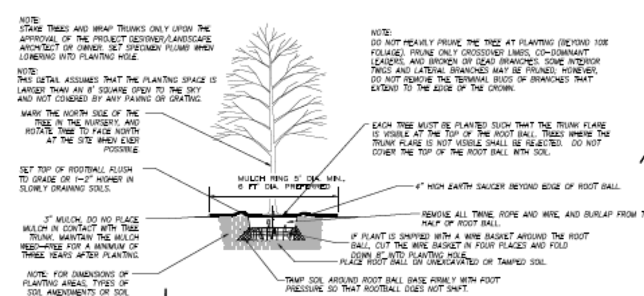
TREE WRAP SHOULD BE REMOVED AFTER INSTALLATION OR WHEN DIRECTED BY THE LANDSCAPE ARCHITECT. CONTRACTOR IS RESPONSIBLE FOR REMOVAL OF WRAPPING.

(L3) TREE WRAPPING DETAIL

NOTE:
STAKE TREES AND WRAP TRUNKS ONLY UPON THE APPROVAL OF THE PROJECT DESIGNER/LANDSCAPE ARCHITECT OR OWNER. SET SPECIMEN PLUMB WHEN LOWERING INTO PLANTING HOLE.

NOTE:
THIS DETAIL ASSUMES THAT THE PLANTING SPACE IS LARGER THAN AN 8' SQUARE OPEN TO THE SKY AND NOT COVERED BY ANY PAVING OR GRATING.

NOTE:
DO NOT HEAVILY PRUNE THE TREE AT PLANTING (BEYOND 10% FOLIAGE). PRUNE ONLY CROSSOVER LIMBS, CO-DOMINANT LEADERS, AND BROKEN OR DEAD BRANCHES. SOME INTERIOR TWIGS AND LATERAL BRANCHES MAY BE PRUNED; HOWEVER, DO NOT REMOVE THE TERMINAL BUDS OF BRANCHES THAT EXTEND TO THE EDGE OF THE CROWN.



(L1) DECIDUOUS TREE PLANTING DETAIL

NO.	REVISION DESCRIPTION:	BY:	DATE:

ABONMARCHE

Engineering · Architecture · Land Surveying

CHINMAYA MISSION SUNDAY SCHOOL
MERRILLVILLE, INDIANA

LANDSCAPE PLAN

DRAWN BY: MFZ
DESIGNED BY:
PM REVIEW: RSP
QA/QC REVIEW:
DATE: 11/15/17

RANDELL S. PETERSON
REGISTERED No. 10403848
STATE OF INDIANA
PROFESSIONAL ENGINEER

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SCALE:
HORZ: 1"=20'
VERT:

ACI JOB #: 17-1298

SHEET NO.: C7.0

LID Compliance Summary Worksheet (Table 6-2)

Project Information

Project Name	**Chinmaya Mission Sunday School**	**Developer/ Owner**	**Chinmaya Mission Northwest Indiana, Inc.**
Plan Preparer	**Abonmarche Consultants**	**Developer/Owner Address**	**8605 Merrillville Road**
Plan Preparer Telephone	**219-850-4624**	**Developer/Owner Telephone**	

This worksheet is a tool to allow both the Municipality and the Developer/Owner to reference various measures implemented within the development in order to meet the development's Storm Water Management Ordinance requirements.

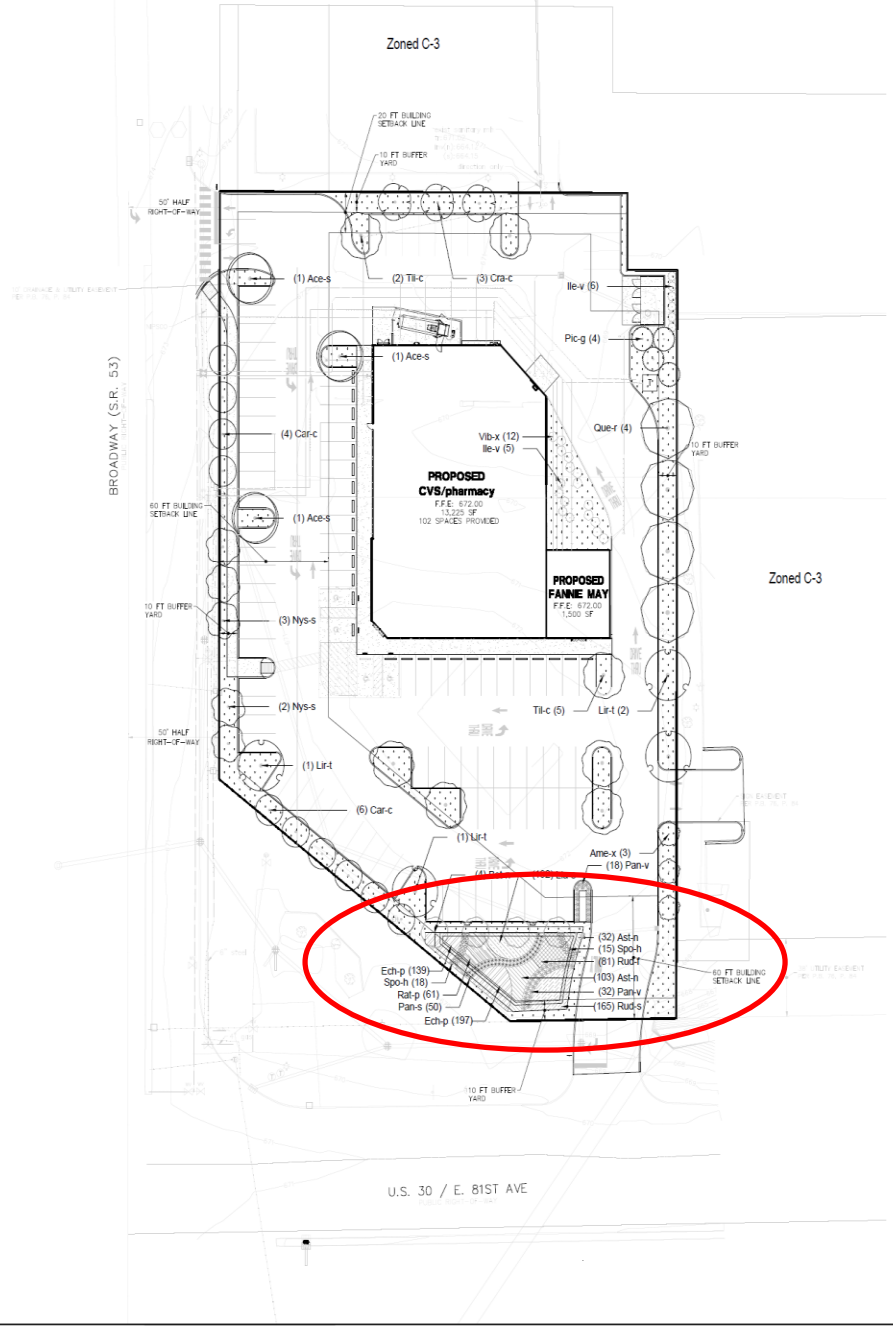
Site Specific Information

Total Site Area (ac)	**2.36**
Total Disturbed Area (ac)	**2.20**
Total Required LID Points (disturbed acres x 100)	**220**

LOW IMPACT DEVELOPMENT BMP	Quantity of BMP	LID Points	Proposed Quantity	Proposed LID Points
Bio-Retention Facility (Rain Garden)	100sf	20	5659	1132
Catch Basin Inserts	1ea	10		
Cistern/Dry Well	1ea	10		
Constructed Wetland	100sf	20		
Dry Extended Detention Basins	100sf	20		
Infiltration Basin	100sf	10		
Infiltration Trench	100sf	10		
Media Filtration	1ea	10		
Storm Drain Inserts / Hydrocarbon Filters	1ea	10		
Vegetated Filter Strips	100sf	10		
Vegetated Swales	100 linear ft.	10		
Wet Ponds/Retention Basins	100sf	20		
Pervious Pavement with Infiltration Bed	100sf	10		
Vegetated Roof	100sf	15		
Level Spreaders	100 linear ft	15		
Hydrodynamic Separator	1ea	50		
Two Stage Ditch	100 linear ft	15		
Riparian Buffer Restoration	100sf	5		
Wetland Restoration/Creation	100sf	20		
Cluster Design	1ac	10		
Open Space Conservation	100sf	10		
Sensitive Area Protection	100 linear ft.	10		
LEED Certification	1ac	20		
Native Revegetation	100sf	10		
Stormwater Disconnectivity	1ea	5-commercial 1-residential		
Additional Tree Installation	1ea	5		
Design for LEED Certification	100sf	20		
OTHER – RAIN BARRELS	variable	variable	2	VARIABLE
OTHER- NO MOW FESCUE SEED MIX	variable	variable	13640 SFT	VARIABLE
OTHER- RECYCLED PIPE	variable	variable	100 LFT	VARIABLE
		Total Proposed LID Points	1132	

Note: Not all LID measures are necessary or appropriate for every site. It is imperative that proper site assessments and due diligence is completed by the Developer and/or Engineer prior to design.

CVS



CONTEXT
landscape architecture
10 S. Main Street, Suite 200 Fort Wayne, IN 46802
tel 317.455.6900 www.context-design.com

GENERAL LANDSCAPE AND PLANTING NOTES

1. Plant material to be installed and maintained by a qualified and experienced landscape installer.
2. All materials are subject to the approval of the Landscape Architect and Owner at any time. Landscape Architect to inspect all plant locations and plant bed conditions prior to installation. Stake all plant locations for review and approval by the Landscape Architect before planting. On-site adjustments may be required. Plants are to be freshly dug. Transporting of plants shall be done in a manner as to not destroy the natural shape, compromise the health, or alter the characteristics of plant materials.
3. Rootballs shall meet or exceed size standards as set forth in 'American Standards for Nursery Stock'. MAIN LEADERS OF ALL TREES SHALL REMAIN INTACT. Remove from the site any plant material that turns brown or defoliates within five (5) days after planting. Replace immediately with approved, specified material.
4. Plant counts indicated on drawings are for Landscape Architect's use only. Contractor shall make own plant quantity takeoffs using drawings, specifications, and plant schedule requirements (i.e., spacing), unless otherwise directed by Landscape Architect. Contractor to verify bed measurements and install appropriate quantities as governed by plant spacing per schedule.
5. All plant beds shall receive 3" minimum of genuine shredded hardwood bark mulch (unless otherwise noted). Apply pre-emergent herbicide as directed by the manufacturer prior to installing mulch. Sod all areas disturbed by construction activities that are not otherwise noted to receive pavement, planting bed, or other treatment.
6. The Contractor shall install and/or amend topsoil in all proposed bed areas to meet ASTM D5268 standards. Landscaper shall verify depth and quality of topsoil prior to plant installation. A minimum of 4" of topsoil is required for lawn areas; 12" for plant beds. Topsoil sources shall include the reuse of surface soil stockpiled on site, clean of roots, plants, sod, stones, clay lumps, and other extraneous or foreign materials larger than 1". Supplement with imported topsoil from off-site sources when quantities are insufficient. Do not obtain supplemental topsoil from agricultural land, bogs, or marshes. Inorganic amendments, organic amendments, and fertilizers shall be used to amend topsoil as needed for long-term plant health.
7. Verify all utility locations in the field prior to beginning work. Repair all damaged utilities to satisfaction of the Owner and Operating Authority at no additional cost.
8. Install all plant material in accordance with all local codes and ordinances. Coordinate with the Owner to obtain any required permits necessary to complete work. All workmanship and materials shall be guaranteed by the Contractor for a period of one (1) calendar year after Final Acceptance.
9. Satisfactory Sodded Lawn: At end of maintenance period, a healthy, uniform, close stand of grass has been established, free of weeds and surface irregularities, with coverage exceeding 90 percent over any 10 sq. ft. (0.92 sq. m) and bare spots not exceeding 3 by 3 inches.Reestablish lawns that do not comply with requirements and continue maintenance until lawns are fully satisfactory to the Owner.

PROJECT DESCRIPTION

The proposed development consists of the demolition of the existing Pepe's Restaurant and Fannie May Candy store to construct the proposed 13,225 sft CVS Pharmacy and attached proposed Fannie May Candy store. The entrances to the site will remain in the current locations and the parking lot will be paved and landscaped. All associated utility infrastructure will be provided as a part of this project. A rain garden is being provided on the southern portion of the site to meet the stormwater quantity requirements.

LANDSCAPE ORDINANCE REQUIREMENTS

Site Zoned C-3 - Highway Commercial

INTERIOR LANDSCAPING
1 Tree or 5 Shrubs per 800 SF of interior area; 1 Shrub per 250 SF of interior area
1598 SF / 800 SF = 2 Trees or 10 Shrubs Required, 10 Shrubs Provided
1598 SF / 250 SF = 7 Shrubs Required and Provided

PARKWAY/STREET TREE STANDARDS
Minimum 1 Canopy Tree per 40 LF or fraction thereof
West: Broadway (SR 53): 386 LF / 40 LF = 10 Canopy Trees Required and Provided (4 are within 10' Drainage and Utility Easement)
South: US 30 / E. 81st Ave: 191 LF / 40 = 5 Canopy Trees Required

BUFFER ZONE
Adjacent parcel is also zoned C-3, so no buffer zone required

REQUIRED PARKING AREA LANDSCAPING
1 Canopy Tree per 2000 SF of Paved Surface
54,493 SF Paved Surface / 2,000 SF = 28 Canopy Trees Required and Provided

ENTRY POINT PLANTINGS
Minimum 300 SF and 10' wide planting area required around monument sign

MIXING OF SPECIES
25% maximum of any one tree or shrub species

Fully Screen Dumpsters and Loading Facilities

HATCH LEGEND

Sodded Lawn

Note: Irrigation shall be design build. Contractor to ensure all irrigation lines and appurtenances are located within property boundaries.

North 0 10 20 40
Scale 1" = 20'-0"

CVS pharmacy

13,225 TYPE-B LEFT CHAMFER DRIVE-THRU
STORE NUMBER: XXXXX
NEC US. 80 AND BROADWAY
MERRILLVILLE, IN
PROJECT TYPE
DEAL TYPE
CS PROJECT NUMBER: 58185

ARCHITECT OF RECORD

CONSULTANT:
AMERIGON STRUCTUREPOINT INC.
7260 SHADELAND STATION
INDIANAPOLIS, INDIANA 46256
p:(317) 547-5580 f:(317) 543-0270
www.structurepoint.com

DEVELOPER:
G.B. Indiana 2, LLC
600 East 96th St. Suite 150
Indianapolis, Indiana 46240
Phone (317) 574-7333
Fax (317) 574-7336
Contact: Craig Forgey

SEAL:
ALYSSA P. PRAZEAU REGISTERED No. 2002-132 STATE OF INDIANA LANDSCAPE ARCHITECT
EXPIRES 12/31/2015

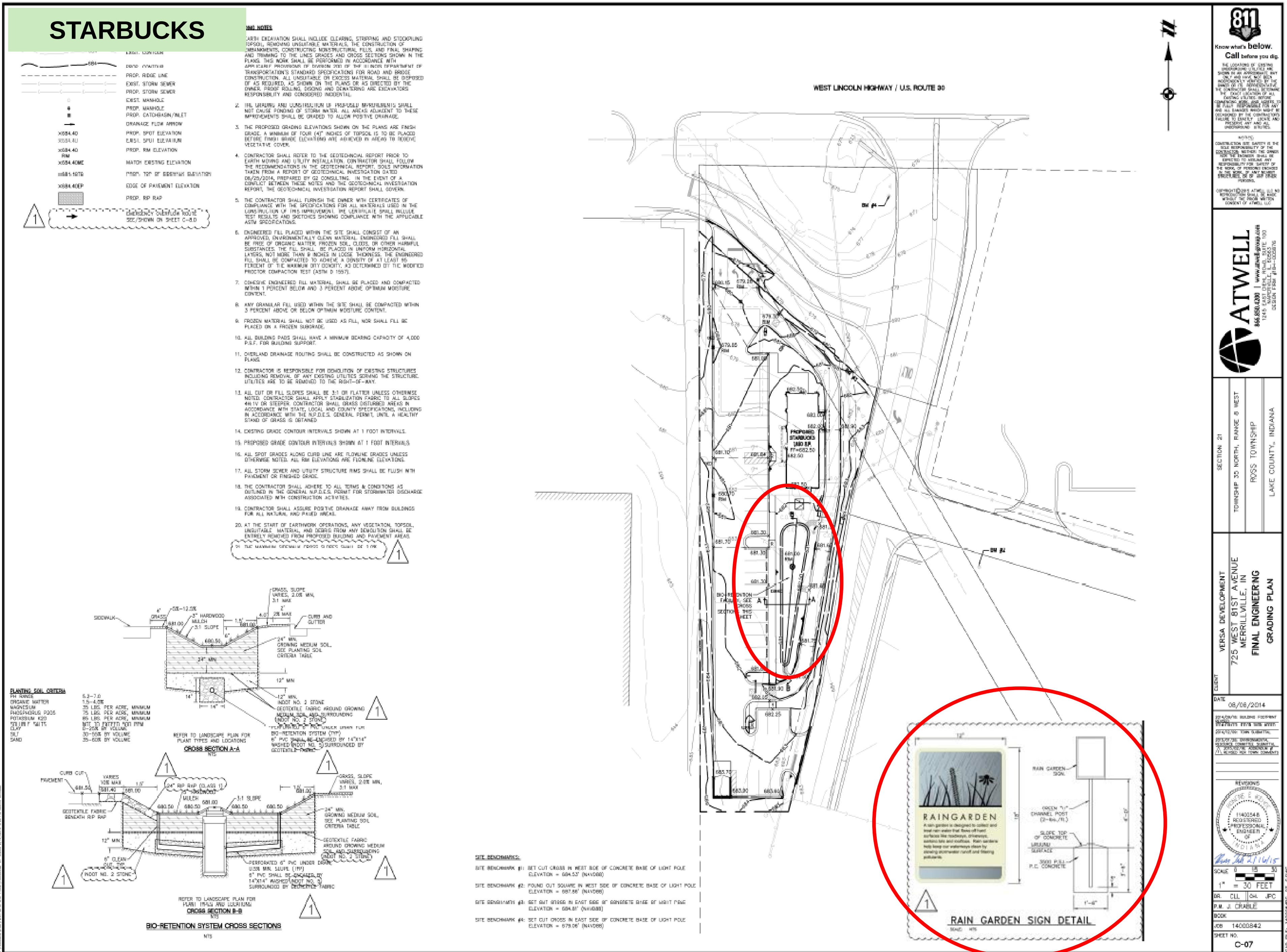
REVISIONS:

PLANNING MGR: APP
DRAWING BY: KMP
DATE: 02/12/2015
JOB NUMBER: 200900265
TITLE: PLANTING PLAN
SHEET NUMBER: L100
COMMENTS:


THRU TRUCKS USE CENTER LANE


What is a Rain Garden?
Rain gardens are a mix of special soils and native plants that filter storm water run-off and reduce the amount of rain water that flows untreated into storm drains. Rain gardens also provide habitat for wildlife and add natural beauty.

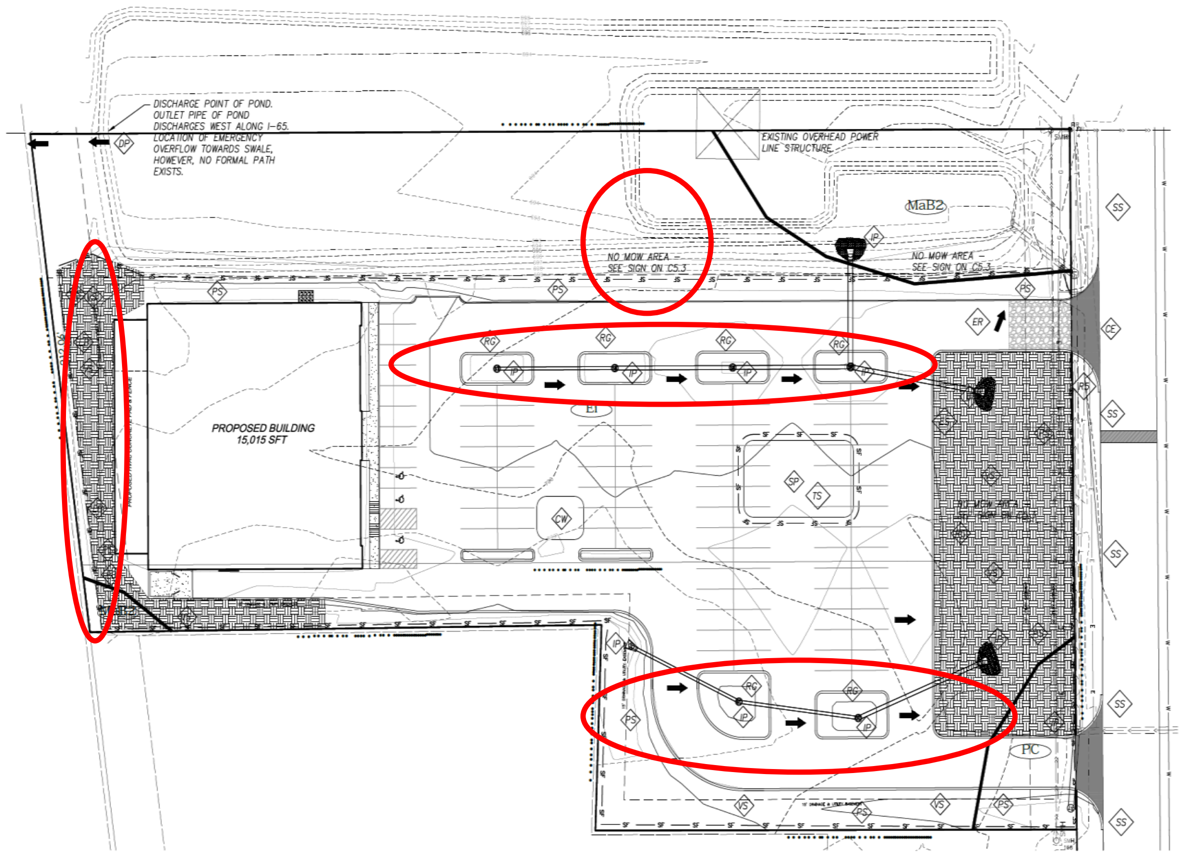
STARBUCKS



WEST LINCOLN HIGHWAY / U.S. ROUTE 30
PROPOSED STARBUCKS
CROSS SECTION A-A
CROSS SECTION B-B
BIO-RETENTION SYSTEM CROSS SECTIONS
SITE BENCHMARKS:
RAINGARDEN
RAIN GARDEN SIGN DETAIL
811 Know what's below. Call before you dig.
ATWELL
VERSA DEVELOPMENT
725 WEST 81ST AVENUE
MERRILLVILLE, IN
FINAL ENGINEERING
GRADING PLAN
SECTION 21
TOWNSHIP 35 NORTH, RANGE 8 WEST
ROSS TOWNSHIP
LAKE COUNTY, INDIANA
C-07


DRIVE THRU
1-855-GO-POTTY

POINT BLANK GUN RANGE



SWPPP Key Notes
See Sheet 8 for Details unless otherwise noted

- SF – SILT FENCE
- CE – GRAVEL CONSTRCUTION ENTRANCE
- CL – CONSTRUCTION LIMITS DISTURBED AREA = +/–SILT FENCE
- PS – PERMANENT SEEDING
- IP – INLET PROTECTION
- DP – PROJECT STORMWATER DISCHARGE POINT
- CW – CONCRETE WASHOUT
- SA – CONSTRUCTION STAGING AREA
- RG – RAIN GARDEN, W/ SIGN
- VS – VEGETATED SWALE
- SP – STOCK PILE, SEE DETAILS C5.2
- EB – EROSION CONTROL BLANKET
- ER – STORMWATER EMERGENCY OVERFLOW ROUTING PATH
- ES – EMERGENCY SPILLWAY
- R5 – RULE 5 PERMIT POSTING
- TS – TEMPORARY SEEDING, (14 DAYS)
- SS – STREET SWEEPING
- Ph – SOIL TYPE
- SOIL DELINEATION

NOTE:
– ALL CURB, WITH THE EXCEPTION OF THE NORTHERN EDGE OF PARKING LOT, IS TO BE RIBBON CURB. SEE SITE PLAN, C2.0, FOR DETAILS.

– RAIN GARDEN SIGN SHALL BE PLACED AT ALL RAIN GARDENS

CONTACT FOR OWNER/DEVELOPER/REPONSIBLE PARTY:

HGR Development
9S151 Skylane Drive
Naperville, IN 60564
Phone: 765–398–1260
Contact: Jeff Jones

GOVERNING AGENCIES AND PERMITTING

LOCAL:
TOWN OF MERRILLVILLE STORMWATER UTILITY
7404 BROADWAY, MERRILLVILLE, IN 46410
219–472–8668

STATE:
INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
OFFICE OF WATER MANAGEMENT
100 SENATE AVENUE, P.O. BOX 6015
INDIANAPOLIS, INDIANA 46206–6015
317–323–8760, 800–451–6027

SOILS LEGEND

Table-Hydrologic Soil Group
Hydrologic Soil Group- Summary by Map Unit - Town of Merrillville, Indiana (IN157)

SOIL SYMBOL	SOIL NAME	HYDRO GROUP	Acres	% of AOI
Ei	Elliott silt loam 0 to 2 percent slopes	C/D	3.3±	91.7%
MaB2	Markham silt loam 2 to 6 percent slopes	C	0.2±	5.5%
Pc	Pewamo silty clay loam	C/D	0.1±	2.8%
Totals for Area of Interest			3.6±	100%

Source: NRCS Web Soil Survey

GRAPHIC SCALE
30 0 15 30 60 120
(IN FEET)
1 inch = 30 ft.

NO.	REVISION DESCRIPTION:	BY:	DATE:
NO.2	REVISION DESCRIPTION: COMMENTS PER TOWN OF MERRILLVILLE	BY:MPZ	DATE:10/31/16
NO.1	REVISION DESCRIPTION: COMMENTS PER TOWN OF MERRILLVILLE	BY:MPZ	DATE:10/20/16

ABONMARCHE
Confidence By Design
Engineering
Architecture
Land Surveying
Marina/Waterfront
Community Planning
Landscape Architecture
Development Services
17 N. Washington St.
Valparaiso, IN 46383
T 219.850.4624
F 219.850.4625
Manistee, MI
South Haven, MI
South Bend, IN
Benton Harbor, MI
Lafayette, IN
Battle Creek, MI

PROJECT: HGR DEVELOPMENT POINT BLANK GUN RANGE

SHEET TITLE: STORMWATER POLLUTION PREVENTION PLAN

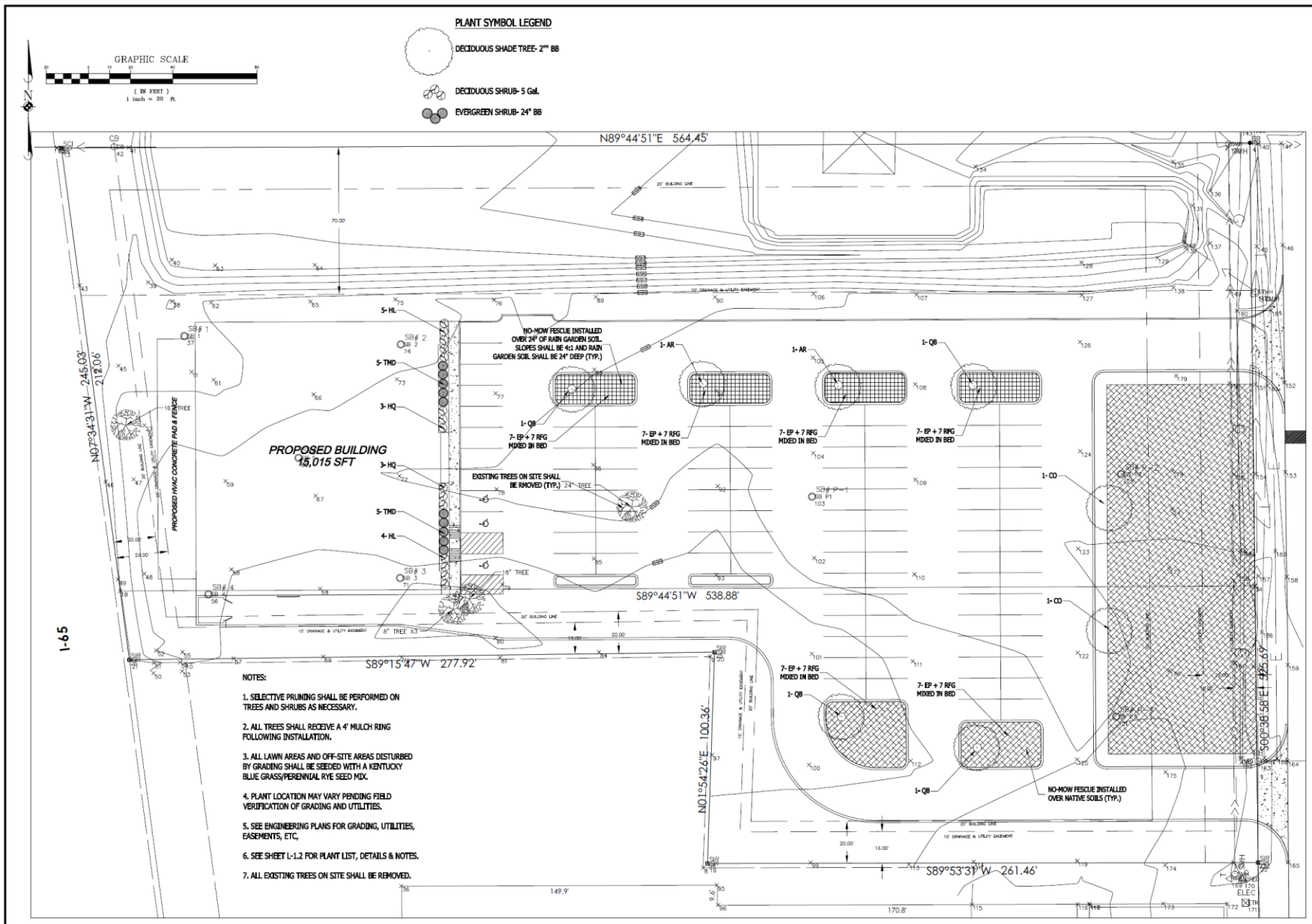
DRAWN BY: MPZ
DESIGNED BY: MPZ
PM REVIEW: RSP
QA/QC REVIEW:
DATE: 10/3/16
SEAL: RANDELL S. PETERSON REGISTERED No. 10403848 STATE OF INDIANA PROFESSIONAL ENGINEER
SIGNATURE:
DATE:

HARD COPY IS INTENDED TO BE 24" X 36" WHEN PLOTTED. SCALE(S) INDICATED AND GRAPHIC QUALITY MAY NOT BE ACCURATE FOR ANY OTHER SIZES

SCALE:
HORZ: 1"=30'
VERT:

ACI JOB #
16-0687

SHEET NO.
C5.0

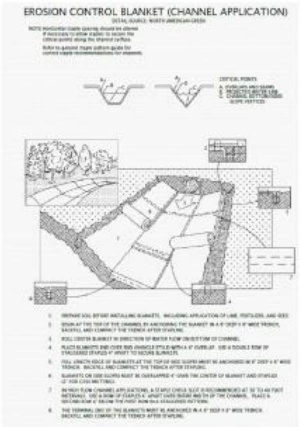


PREPARED BY:
ZENERE COMPANIES, INC.
317 E. MARGARET STREET
THORNTON, IL
PHONE: 708-877-9306 INFO@ZENERECOMPANIES.COM

POINT BLANK GUN RANGE
MERRILLVILLE, INDIANA
PROPOSED LANDSCAPE

DRAWN BY: BP
APPROVED BY: PZ
DATE: 10/17/25
SCALE: 1" = 20'-0"

SHEET
L-1.1
OF
2



EROSION CONTROL BLANKET WITHIN SWALE

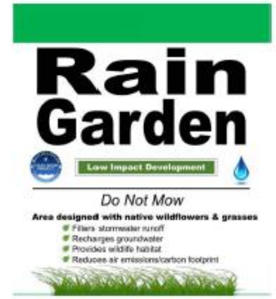
–NOT TO SCALE–


Date:
Project:
Inspected by:
Type of Inspection: ☐ Routine Weekly ☐ Rain Event (0.5" or more)

CONSTRUCTION SITE INSPECTION AND MAINTENANCE LOG
(To be completed by Trained Individual/Project Manager)

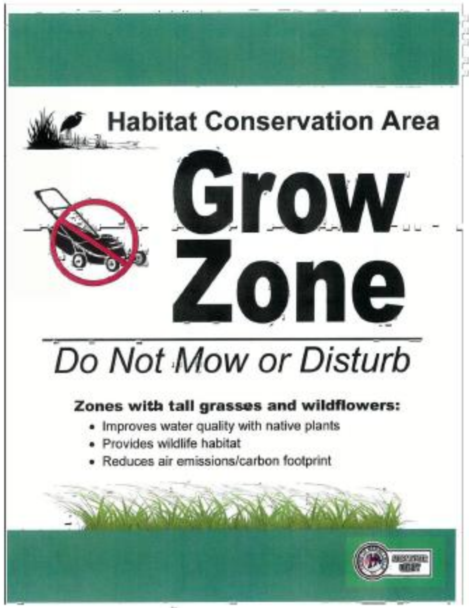
SELF MONITORING DETAILS

–NOT TO SCALE–



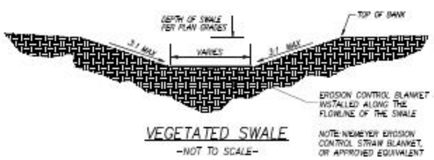
RAIN GARDEN SIGN

–NOT TO SCALE–



NO MOW SIGN (OR APPROVED EQUAL)

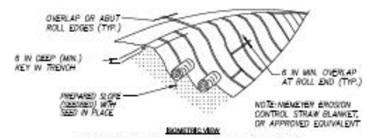
–NOT TO SCALE–



VEGETATED SWALE

–NOT TO SCALE–

NOTE: NEMEYER EROSION CONTROL STRAW BLANKET, OR APPROVED EQUIVALENT



NOTE: NEMEYER EROSION CONTROL STRAW BLANKET, OR APPROVED EQUIVALENT

EROSION CONTROL BLANKET

–NOT TO SCALE–

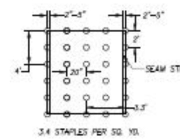
CONSTRUCTION SPECIFICATIONS FOR EROSION CONTROL BLANKET

1. USE MATTING THAT HAS A DESIGN VALUE FOR SHEAR STRESS EQUAL TO OR HIGHER THAN THE SHEAR STRESS DESIGNATED ON APPROVED PLANS.
2. USE TEMPORARY SOIL STABILIZATION MATTING MADE OF DEGRADABLE (LASTS 6 MONTHS MINIMUM) NATURAL OR MAN-MADE FIBERS (MOSTLY ORGANIC). MAT MUST HAVE UNIFORM THICKNESS AND DISTRIBUTION OF FIBERS THROUGHOUT AND BE SMOLDER RESISTANT. CHEMICALS USED IN THE MAT MUST BE NON-LEACHING AND NON-TOXIC TO VEGETATION AND SEED GERMINATION AND NON-INJURIOUS TO THE SKIN. IF PRESENT, NETTING MUST BE EXTRUDED PLASTIC WITH A MAXIMUM MESH OPENING OF 2x2 INCHES AND SUFFICIENTLY BONDED OR SEWN ON 2 INCH CENTERS ALONG LONGITUDINAL AXIS OF THE MATERIAL TO PREVENT SEPARATION OF THE NET FROM THE PARENT MATERIAL.
3. SECURE MATTING USING STEEL STAPLES, WOOD STAKES, OR BIODEGRADABLE EQUIVALENT. STAPLES MUST BE "U" OR "T" SHAPED STEEL WIRE HAVING A MINIMUM GAUGE OF NO. 11 AND NO. 8 RESPECTIVELY. "U" SHAPED STAPLES MUST AVERAGE 1 TO 1½ INCHES WIDE AND BE A MINIMUM OF 6 INCHES LONG. "T" SHAPED STAPLES MUST HAVE A MINIMUM 8 INCH MAIN LEG, A MINIMUM 1 INCH SECONDARY LEG, AND A MINIMUM 4 INCH HEAD. WOOD STAKES MUST BE ROUGH-SAWN HARDWOOD,
12 TO 24 INCHES IN LENGTH, 1x3 INCH IN CROSS SECTION, AND WEDGE SHAPED AT THE BOTTOM.
4. PERFORM FINAL GRADING, TOPSOIL APPLICATION, SEEDBED PREPARATION, AND PERMANENT SEEDING IN ACCORDANCE WITH SPECIFICATIONS. PLACE MATTING WITHIN 48 HOURS OF COMPLETING SEEDING OPERATIONS UNLESS END OF WORKDAY STABILIZATION IS SPECIFIED ON THE APPROVED EROSION & SEDIMENT CONTROL PLAN.
5. UNROLL MATTING DOWNSLOPE. LAY MAT SMOOTHLY AND FIRMLY UPON THE SEEDED SURFACE. AVOID STRETCHING THE MATTING.
6. OVERLAP OR ABUT ROLL EDGES PER MANUFACTURER RECOMMENDATIONS. OVERLAP ROLL ENDS BY
6 INCHES (MINIMUM), WITH THE UPSLOPE MAT OVERLAPPING ON TOP OF THE DOWNSLOPE MAT.
7. KEY IN THE UPSLOPE END OF MAT 6 INCHES (MINIMUM) BY DIGGING A TRENCH, PLACING THE MATTING ROLL END IN THE TRENCH, STAPLING THE MAT IN PLACE, REPLACING THE EXCAVATED MATERIAL, AND TAMPING TO SECURE THE MAT END IN THE KEY.
8. STAPLE/STAKE MAT IN A STAGGERED PATTERN ON 4 FOOT (MAXIMUM) CENTERS THROUGHOUT AND
2 FOOT (MAXIMUM) CENTERS ALONG SEAMS, JOINTS, AND ROLL ENDS.
9. ESTABLISH, MAINTAIN AND INSPECT VEGETATION SO THAT LOCAL REQUIREMENTS FOR ADEQUATE VEGETATIVE ESTABLISHMENT ARE CONTINUOUSLY MET.

1. Post signed Rule 5 NOI Permit # at location visible to the public.
2. Ensure that the Rule 5 permit is on the NOI
3. Ensure that there is a note of where a complete set of plans are located.
4. Ensure that the posting is waterproof.
5. Posting shall include all other applicable permits.
6. Posting shall be located as shown on the construction plans, near the main entrance of the construction site.

PERMIT POSTING DETAILS

–NOT TO SCALE–



3.4 STAPLES PER SQ. YD.

EROSION CONTROL BLANKET STAPLE PATERN DETAIL

–NOT TO SCALE–

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NO.1	REVISION DESCRIPTION: COMMENTS PER TOWN OF MERRILLVILLE	BY: MPZ	DATE: 10/20/16

ABONMARCHE

PROJECT: HGR DEVELOPMENT POINT BLANK GUN RANGE

SHEET TITLE: STORMWATER POLLUTION PREVENTION PLAN DETAILS

DRAWN BY: MPZ
DESIGNED BY: MPZ
PM REVIEW: RSP
QA/QC REVIEW:
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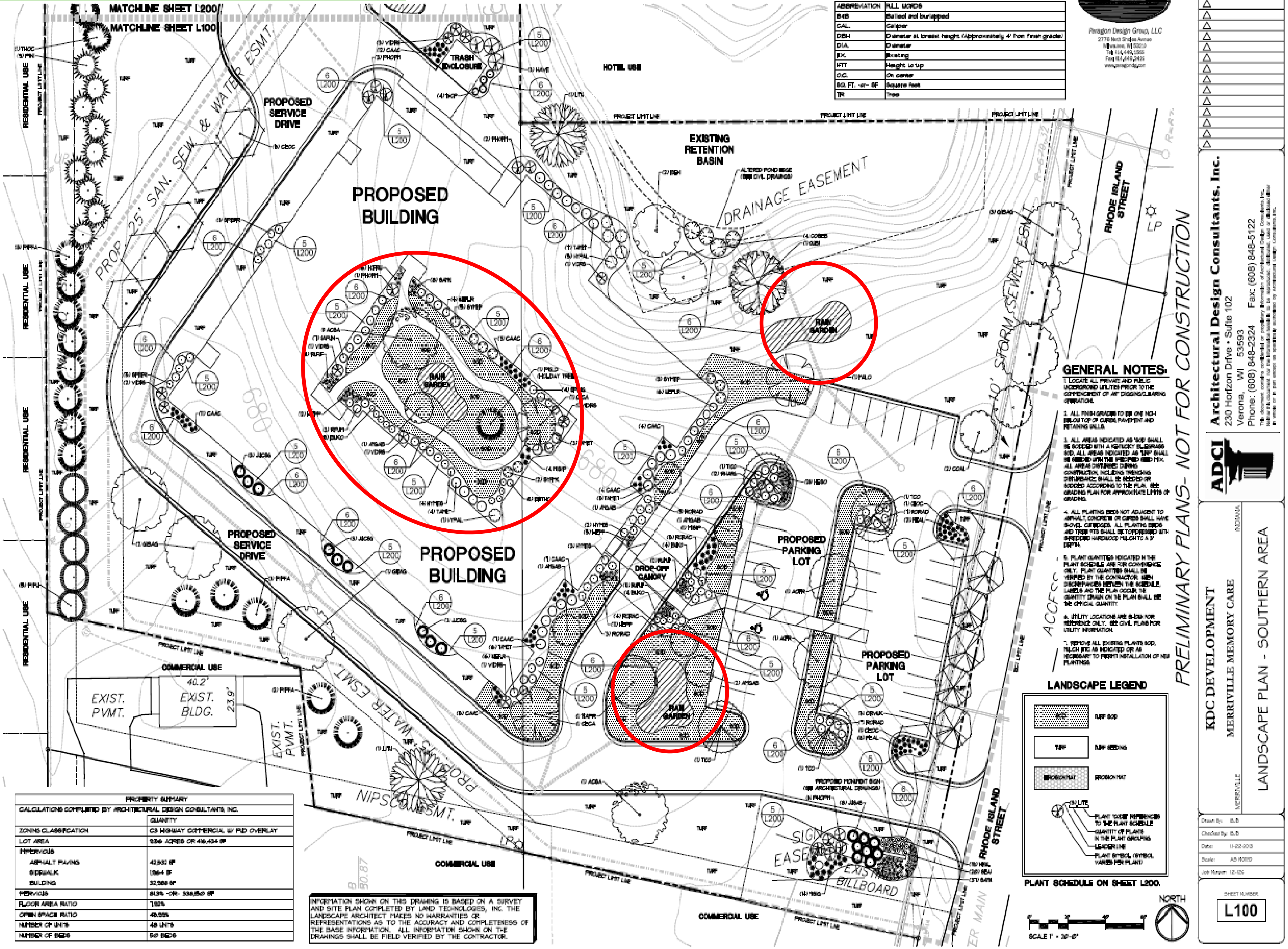
SCALE: HORZ: VERT:
ACI JOB # 16-0687
SHEET NO. C5.3


Rain
Garden


Rain
Garden
Do Not Mow

MERRILLVILLE MEMORY CARE



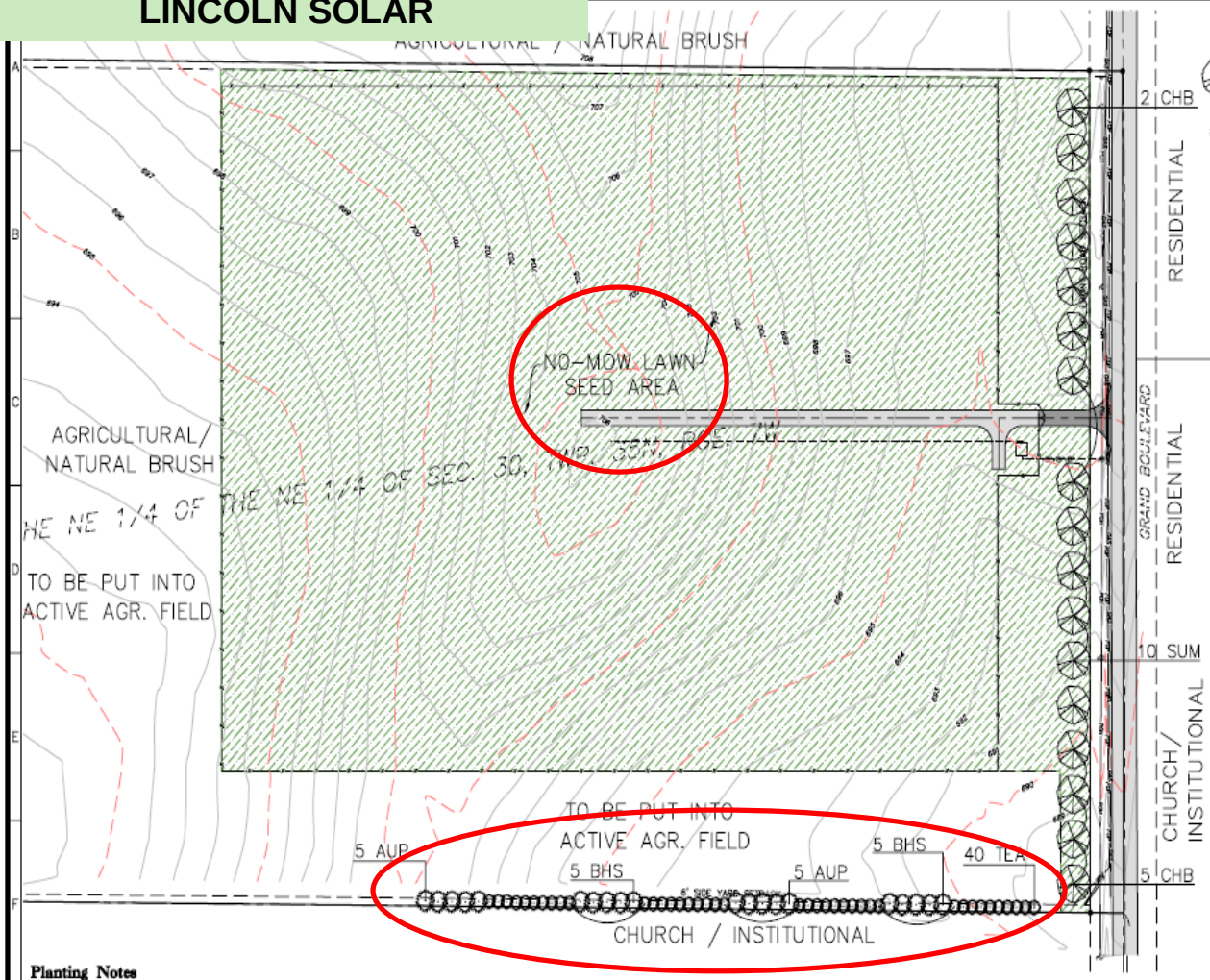
ABBREVIATIONS

ABBREVIATION	FULL WORDS
B&B	Balled and burlapped
CAL.	Caliper
DBH	Diameter at breast height (Approximately 4' from finish grade)
DIA.	Diameter
EX.	Existing
HTT	Height to top
O.C.	On center
SQ. FT. -or- SF	Square feet
TR	Tree

PROPERTY SUMMARY	
CALCULATIONS COMPLETED BY ARCHITECTURAL DESIGN CONSULTANTS, INC.	
	QUANTITY
ZONING CLASSIFICATION	C3 HIGHWAY COMMERCIAL W/ PUD OVERLAY
LOT AREA	9.56 ACRES OR 416,434 SF
IMPERVIOUS	
ASPHALT PAVING	42,532 SF
SIDEWALK	1,964 SF
BUILDING	32,388 SF
PERVIOUS	81.3% -OR- 338,550 SF
FLOOR AREA RATIO	7.8%
OPEN SPACE RATIO	45.05%
NUMBER OF UNITS	48 UNITS
NUMBER OF BEDS	56 BEDS

INFORMATION SHOWN ON THIS DRAWING IS BASED ON A SURVEY AND SITE PLAN COMPLETED BY LAND TECHNOLOGIES, INC. THE LANDSCAPE ARCHITECT MAKES NO WARRANTIES OR REPRESENTATIONS AS TO THE ACCURACY AND COMPLETENESS OF THE BASE INFORMATION. ALL INFORMATION SHOWN ON THE DRAWINGS SHALL BE FIELD VERIFIED BY THE CONTRACTOR.

LINCOLN SOLAR



Final Plant Schedule

	CODE	QTY.	COMMON/BOTANICAL NAME	SIZE	SPACING O.C.
	SUM	10	Sugar Maple / Acer saccharum	2.0" BB	35'
	CHB	7	Common Hackberry / Celtis occidentalis	2.0" BB	35'
	BHS	10	Black Hills Spruce / Pice glauca densata	6' BB	12'
	AUP	10	Austrian Pine / Pinus nigra	6' BB	12'
	TEA	40	Techny Arborvitae / Thuja occidentalis "Techny"	4' BB	6'

NOTE: QUANTITIES ON PLAN SUPERSEDE LIST QUANTITIES IN THE EVENT OF A DISCREPANCY.

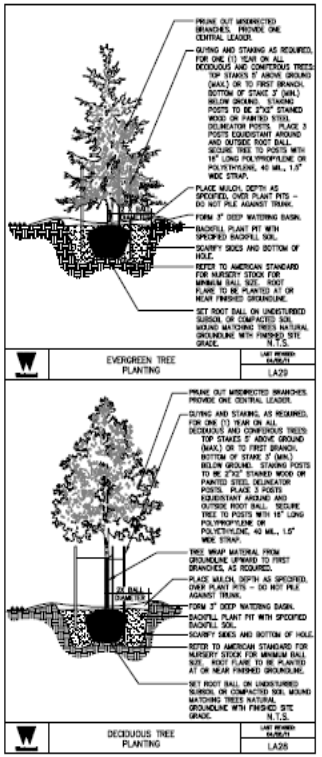
Landscape Requirements

CURRENT ZONING:	R-2
PROPOSED ZONING:	R-2 (CUP)
INTERIOR LANDSCAPING:	46,487 SF = 58 TREES
PARKWAY:	660' = 17 TREES
BUFFER ZONE:	NA
PARKING LOT:	NA
DETENTION POND:	NA
TOTAL	76 TREES

Seeding Specifications

PRAIRIE NURSERY NO-MOW LAWN SEED MIX OR APPROVED EQUIVALENT. (www.prairienursery.com)

ANY AREAS THAT REQUIRE NO-MOW SEEDING SHALL HAVE EXISTING VEGETATION REMOVED DURING SITE GRADING. CHECK SITE TWO WEEKS PRIOR TO SEEDING TO ENSURE NO VEGETATION HAS ESTABLISHED. ANY EXISTING VEGETATION WILL NEED TO BE TREATED WITH ROUND-UP (OR EQUIV.) FOR ONE WEEK. AFTER EXISTING VEGETATION IS DEAD, CULTIVATE AREA FOUR TO FIVE INCHES DEEP PRIOR TO SEEDING. BROADCAST SEED EVENLY THROUGHOUT DESIGNATED AREA AT A RATE OF 110 LBS/AC.
CONTRACTOR TO PROVIDE TEMPORARY IRRIGATION FOR TWO MONTHS OR UNTIL SEED HAS FULLY ESTABLISHED.



Planting Notes

- CONTRACTOR SHALL VERIFY LOCATIONS OF ALL UNDERGROUND UTILITIES PRIOR TO INSTALLATION OF ANY PLANTS OR LANDSCAPE MATERIAL.
- ACTUAL LOCATION OF PLANT MATERIAL IS SUBJECT TO FIELD AND SITE CONDITIONS.
- ALL SUBSTITUTIONS MUST BE APPROVED BY THE LANDSCAPE DESIGNER PRIOR TO SUBMISSION OF ANY BID AND/OR QUOTE BY THE LANDSCAPE CONTRACTOR.
- CONTRACTOR SHALL PROVIDE TWO YEAR GUARANTEE OF ALL PLANT MATERIALS. THE GUARANTEE BEGINS ON THE DATE OF THE OWNER'S WRITTEN ACCEPTANCE OF THE INITIAL PLANTING. REPLACEMENT PLANT MATERIAL SHALL HAVE A ONE YEAR GUARANTEE COMMENCING UPON PLANTING.
- ALL PLANTS TO BE SPECIMEN GRADE, INDIANA-GROWN AND/OR HARDY. SPECIMEN GRADE SHALL ADHERE TO, BUT IS NOT LIMITED BY, THE FOLLOWING STANDARDS:
  ALL PLANTS SHALL BE FREE FROM DISEASE, PESTS, WOUNDS, SCARS, ETC.
  ALL PLANTS SHALL BE FREE FROM NOTICEABLE GAPS, HOLES, OR DEFORMITIES.
  ALL PLANTS SHALL BE FREE FROM BROKEN OR DEAD BRANCHES.
  ALL PLANTS SHALL HAVE HEAVY, HEALTHY BRANCHING AND LEAFING.
  CONIFEROUS TREES SHALL HAVE AN ESTABLISHED MAIN LEADER AND A HEIGHT TO WIDTH RATIO OF NO LESS THAN 3:1.
- PLANTS TO MEET AMERICAN STANDARD FOR NURSERY STOCK (ANSI Z80.1-2004 OR MOST CURRENT VERSION) REQUIREMENTS FOR SIZE AND TYPE SPECIFIED.
- PLANTS TO BE INSTALLED AS PER ANSI STANDARD PLANTING PRACTICES.
- PLANTS SHALL BE IMMEDIATELY PLANTED UPON ARRIVAL AT SITE. PROPERLY HEEL-IN MATERIALS IF NECESSARY; TEMPORARY ONLY.
- PRIOR TO PLANTING, FIELD VERIFY THAT THE ROOT COLLAR/ROOT FLAIR IS LOCATED AT THE TOP OF THE BALLED & BURLAP TREE. IF THIS IS NOT THE CASE, SOIL SHALL BE REMOVED DOWN TO THE ROOT COLLAR/ROOT FLAIR. WHEN THE BALLED & BURLAP TREE IS PLANTED, THE ROOT COLLAR/ROOT FLAIR SHALL BE EVEN OR SLIGHTLY ABOVE FINISHED GRADE.
- OPEN TOP OF BURLAP ON BB MATERIALS; REMOVE POT ON POTTED PLANTS; SPLIT AND BREAK APART PEAT POTS.
- PRUNE PLANTS AS NECESSARY – PER STANDARD NURSERY PRACTICE AND TO CORRECT POOR BRANCHING OF EXISTING AND PROPOSED TREES.
- WRAP ALL SMOOTH-BARKED TREES – FASTEN TOP AND BOTTOM. REMOVE BY APRIL 1ST.
- STAKING OF TREES AS REQUIRED; REPOSITION, PLUMB AND STAKE IF NOT PLUMB AFTER ONE YEAR.
- THE NEED FOR SOIL AMENDMENTS SHALL BE DETERMINED UPON SITE SOIL CONDITIONS PRIOR TO PLANTING. LANDSCAPE CONTRACTOR SHALL NOTIFY LANDSCAPE ARCHITECT FOR THE NEED OF ANY SOIL AMENDMENTS.
- ALL TREES SHALL HAVE 4" DEPTH OF SHREDDED HARDWOOD MULCH. MULCH TO BE FREE OF DELETERIOUS MATERIAL. EVERGREEN HEDGE ALONG SOUTHERN BOUNDARY WILL HAVE A CONTINUOUS MULCH BED 6' WIDE AS LONG AS HEDGE.
- ALL DISTURBED AREAS TO BE SODDED OR SEEDED, UNLESS OTHERWISE NOTED.
- CONTRACTOR SHALL PROVIDE NECESSARY WATERING OF PLANT MATERIALS UNTIL THE PLANT IS FULLY ESTABLISHED. OWNER WILL NOT PROVIDE WATER FOR CONTRACTOR.
- REPAIR, REPLACE, OR PROVIDE SOD/SEED AS REQUIRED FOR ANY ROADWAY BOULEVARD AREAS ADJACENT TO THE SITE DISTURBED DURING CONSTRUCTION.
- REPAIR ALL DAMAGE TO PROPERTY FROM PLANTING OPERATIONS AT NO COST TO OWNER.

Westwood Professional Services, Inc.
7699 Anagram Drive
Eden Prairie, MN 55344
PHONE 952-937-5150
FAX 952-937-5822
TOLL FREE 1-800-887-5150
www.westwoodps.com

Designed: DMC
Checked: DMC
Drawn:
Record Drawing by/date:

Revisions:

#	6/04/12	NSC comments

Prepared for:

Lincoln Solar LLC
1333 Northland Drive, Ste 2
Mendota Heights, IN 55120

0' 50' 100' 150'

Lincoln Solar Project

Lake County, Indiana

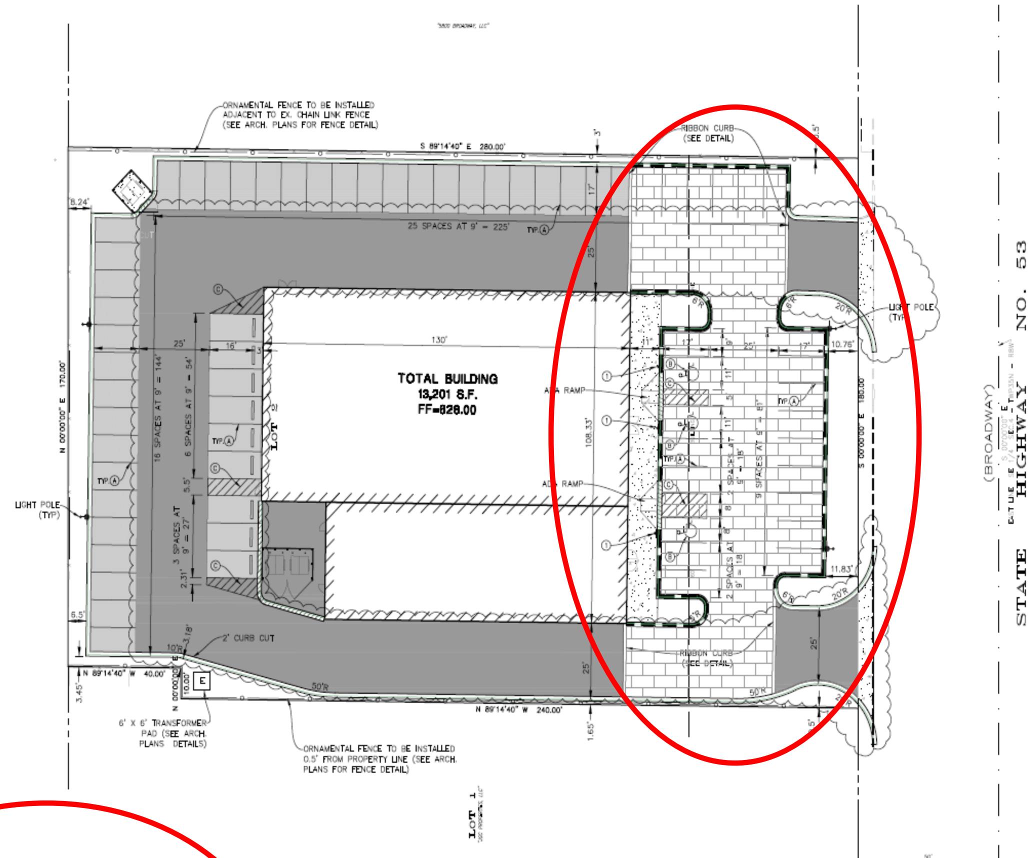
Landscape Plan

FOR DEVELOPMENT APPROVAL

Date 04/03/2012
Sheet 1 OF 1

20121000PLT01-Lincoln.dwg

5840 BROADWAY



GRAPHIC SCALE

SCALE: 1"=20'

PAVEMENT LEGEND

STANDARD DUTY PAVEMENT
110 #/SY (1.5") BIT. SURFACE NO. 11, HV, ON 220 #/SY (2.5") BIT. BINDER NO. 8 OR 9 HV, ON 7" COMP. AGG. BASE, TYPE 0, NO. 53

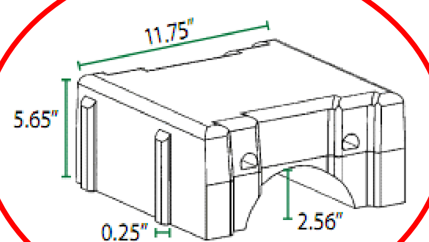
HEAVY DUTY PAVEMENT
220 #/SY (2") BIT. SURFACE NO. 11, HV, ON 330 #/SY (3") BIT. BINDER NO. 8 OR 9 HV, ON 12" COMP. AGG. BASE, TYPE 0, NO. 53

CONCRETE PAVEMENT
8" PORTLAND CEMENT CONCRETE PAVEMENT W/ 6 X 6 W1.4 WWF
4" COMPACTED AGGREGATE BASE, TYPE B

PERMEABLE PAVERS (DETENTION AREA)
5.65" PAVER (PAVEDRAIN ARCH BLOCK)
4" COMPACTED NO. 5 AGGREGATE
12" COMPACTED NO. 2 AGGREGATE

SITE DIMENSIONAL AND PAVING NOTES:

1. ALL DIMENSIONS ARE FACE OF CURB TO FACE OF CURB OR BUILDING FOUNDATION UNLESS NOTED OTHERWISE.
2. ALL PROPOSED CURB AND GUTTER SHALL BE B6.12 UNLESS OTHERWISE NOTED.
3. ALL CURB RADII SHALL BE 3' MEASURED TO FACE OF CURB UNLESS NOTED OTHERWISE.
4. TIE ALL PROPOSED CURB AND GUTTER TO EXISTING CURB AND GUTTER WITH 2-#6 BARS x 18" LONG DOWELED INTO EXISTING CURB.
5. BUILDING DIMENSIONS AND ADJACENT PARKING HAVE BEEN PREPARED BASED UPON ARCHITECTURAL INFORMATION CURRENT AT THE DATE OF THIS DRAWING. SUBSEQUENT ARCHITECTURAL CHANGES MAY EXIST. THEREFORE CONTRACTOR SHALL REFER TO ARCHITECTURAL PLANS FOR PRECISE BUILDING DIMENSIONS AND NOTIFY THE ARCHITECT AND ENGINEER OF ANY DISCREPANCIES PRIOR TO CONSTRUCTION.
6. IMPROVEMENTS ADJACENT TO BUILDING, IF SHOWN, SUCH AS TRUCK DOCK, RETAINING WALLS, SIDEWALKS, CURBING, FENCES, CANOPIES, RAMPS, HANDICAP ACCESS, PLANTERS, DUMPSTERS, AND TRANSFORMERS ETC. HAVE BE SHOWN FOR APPROXIMATE LOCATION ONLY. REFER TO ARCHITECTURAL PLANS FOR EXACT LOCATIONS, SPECIFICATIONS AND DETAILS.
7. LOCATION OF PRIVATE SIDEWALKS SHALL BE COORDINATED WITH PROPOSED DOORWAY. CONTRACTOR TO VERIFY ACTUAL BUILDING PLAN LOCATIONS WITH ARCHITECT/DEVELOPER PRIOR TO CONSTRUCTING THE SIDEWALKS.
8. ALL ROADWAY AND PARKING LOT SIGNAGE, STRIPING, SYMBOLS, ETC. SHALL BE IN ACCORDANCE WITH LATEST JURISDICTIONAL GOVERNMENTAL ENTITY DETAILS.
9. SOME EXISTING ITEMS TO BE REMOVED HAVE BEEN DELETED FROM THIS PLAN FOR CLARITY. SEE DEMOLITION PLAN FOR ITEMS DELETED.
10. DEPRESS CURB & GUTTER AT ALL SIDEWALK AND PATH LOCATIONS FOR HANDICAP ACCESS AS PER FEDERAL AND STATE STANDARDS.
11. THE CONTRACTOR SHALL CONTACT J.U.L.I.E. (1-800-892-0123) PRIOR TO ANY WORK TO LOCATE UTILITIES AND SHALL CONTACT THE OWNER SHOULD UTILITIES APPEAR TO BE IN CONFLICT WITH THE PROPOSED IMPROVEMENT.



CONTROL POINT FOR LAYOUT OF ALL PROPOSED IMPROVEMENTS. BUILDING AND PARKING TO BE PARALLEL AND PERPENDICULAR TO EAST PROPERTY LINE UNLESS OTHERWISE NOTED.

THE UNDERGROUND UTILITY INFORMATION AS SHOWN HEREON IS BASED, IN PART, UPON INFORMATION FURNISHED BY UTILITY COMPANIES AND THE LOCAL MUNICIPALITY. WHILE THIS INFORMATION IS BELIEVED TO BE RELIABLE, ITS ACCURACY AND COMPLETENESS CANNOT BE GUARANTEED NOR CERTIFIED TO.

SITE DATA

SITE AREA	1.15 ACRES
PARKING PROVIDED	67 SPACES
HANDICAP PROVIDED	3 SPACES
PARKING RATIO	5.0 SPACES/1000 S.F.

PAVEMENT MARKING LEGEND

- (A) 4" YELLOW LINE
- (B) LETTERS AND SYMBOLS PAVEMENT MARKINGS
- (C) 4" YELLOW DIAGONAL AT 45° SPACED 2' O.C.

SIGN LEGEND

- (1) R7-8 HANDICAP PARKING SIGN

811
Know what's below. Call before you dig.
Within Indiana Call 811 or 800-382-5544
24 Hours a Day, 7 Days a Week.

Manhard CONSULTING LTD

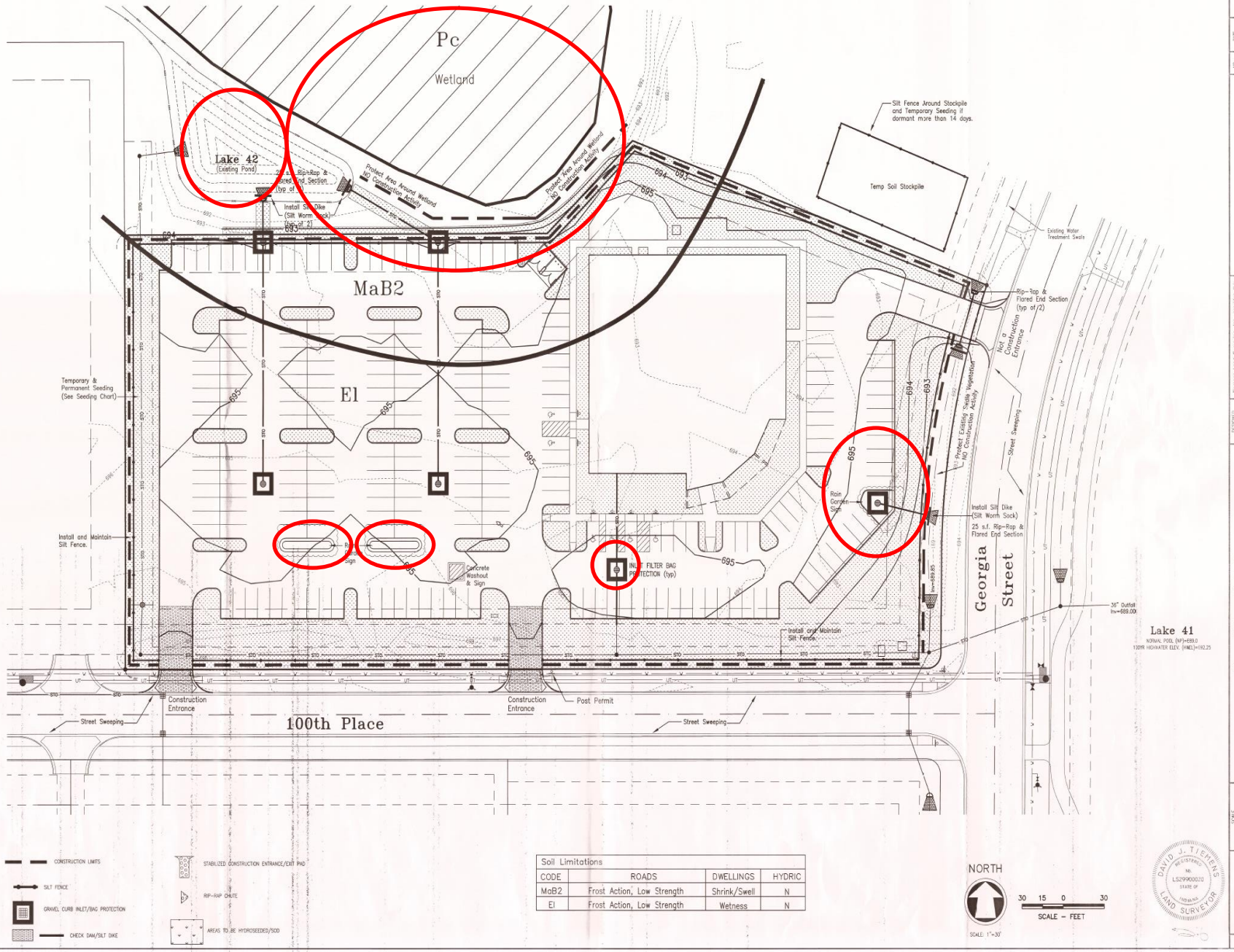
5840 BROADWAY
MERRILLVILLE, INDIANA
SITE DIMENSIONAL AND PAVING PLAN

SHEET 3 OF 11


NEW HOLLAND
C185


LAZZARO
LAZZARO

RILEY BUILDING



Soil Limitations			
CODE	ROADS	DWELLINGS	HYDRIC
MaB2	Frost Action, Low Strength	Shrink/Swell	N
El	Frost Action, Low Strength	Wetness	N

Tiemens Land Surveying, Inc.
527 North Halleck Street, Suite E
DeMotte, Indiana 46310
Phone/Fax: 219-987-2828

NO.	DATE	REVISION
1	2/5/2013	Added Rain Gardens

DESIGNED: DJT
DRAWN: DJT
CHECKED: DJT

The Riley Building
9380 Georgia Street
Merrillville, Indiana

SCALE: 1"=30'
DATE: 12/20/2012
PROJECT NO: 2013-1934

SHEET NO.
Erosion Plan
C4
FILE NO.

DAVID J. TIEMENS
REGISTERED
NO. LS29900020
STATE OF INDIANA
LAND SURVEYOR

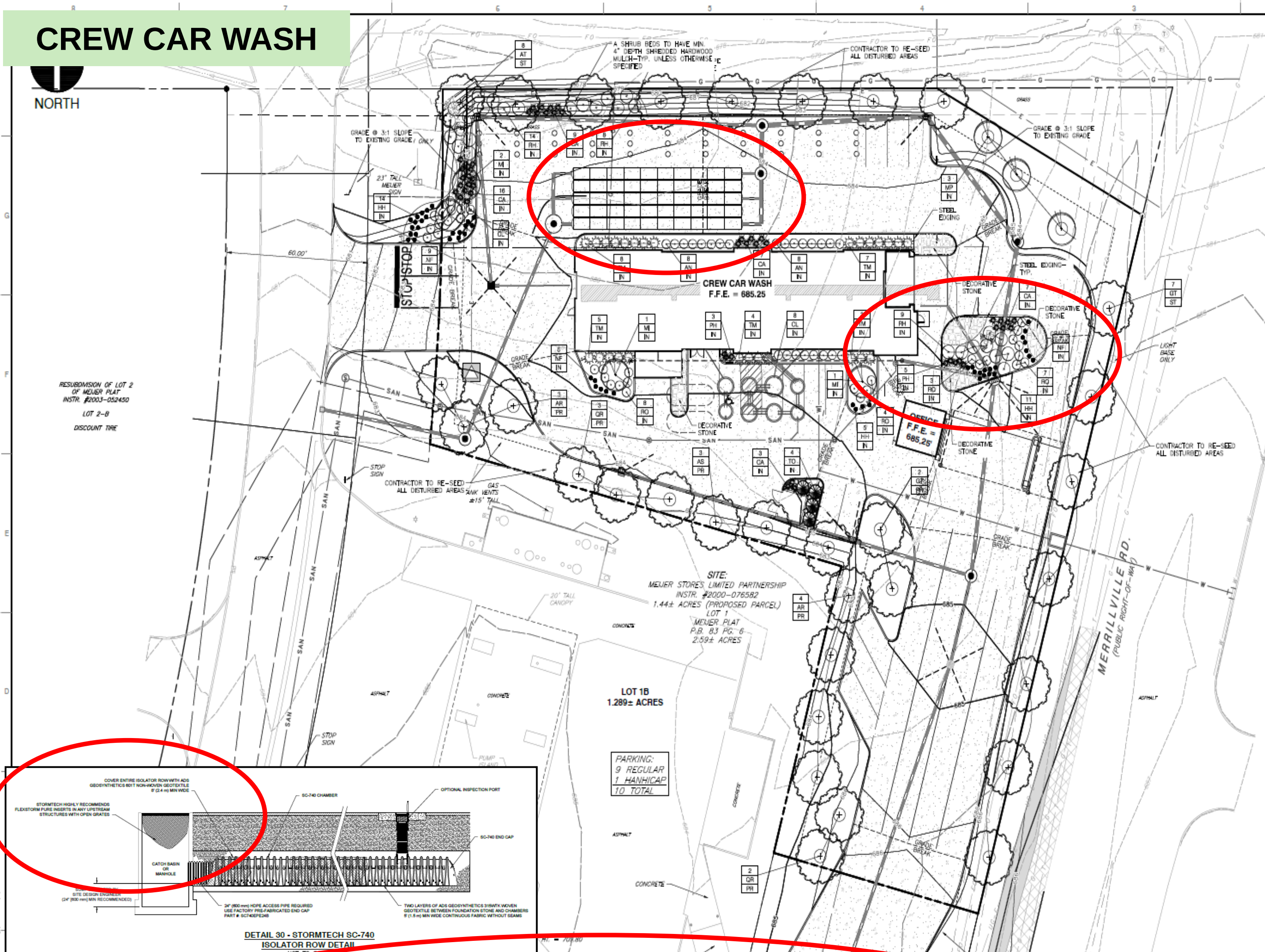

Wetland
Buffer Boundary
DO NOT DISTURB

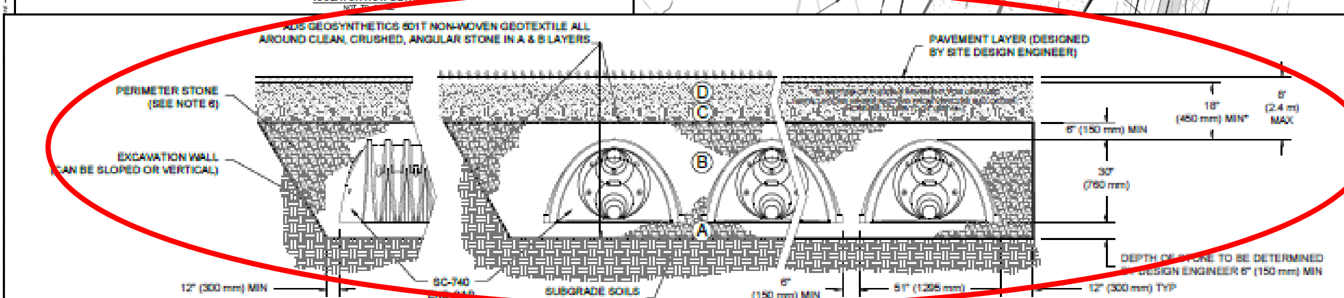

Rain Gardens:
Nature's Way
Of Clearing
The Storm
What Are The Benefits Of Rain Gardens?


Rain Gardens:
Nature's Way
Of Clearing
The Storm


Rain Gardens:
Nature's Way
Of Clearing
The Storm
What Are The Benefits Of Rain Gardens?

CREW CAR WASH





GENERAL LANDSCAPE NOTES:

1. ALL CONSTRUCTION METHODS AND MATERIALS MUST CONFORM TO CURRENT STANDARDS AND SPECIFICATIONS OF THE FEDERAL, STATE, COUNTY, CITY, OR LOCAL REQUIREMENTS, WHICHEVER HAS JURISDICTION.
2. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND ELEVATIONS IN THE FIELD PRIOR TO THE START OF CONSTRUCTION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL FIELD DIMENSIONS AND ELEVATIONS DURING THE ENTIRE CONSTRUCTION SCHEDULE. IF ANY DISCREPANCIES ARE FOUND IN THESE PLANS FROM ACTUAL FIELD DIMENSIONS, THE CONTRACTOR SHALL CONTACT THE ENGINEER IMMEDIATELY.
3. CONTRACTOR SHALL MAINTAIN ONE SET OF AS-BUILT/RECORD DRAWINGS ON THE JOB SITE DURING CONSTRUCTION FOR DISTRIBUTION TO THE OWNER AND/OR OWNER'S REPRESENTATIVE UPON COMPLETION.
4. NO CHANGES TO THE SITE LANDSCAPE LAYOUT ARE ALLOWED WITHOUT THE WRITTEN APPROVAL OF THE ENGINEER.
5. CONTRACTOR SHALL SUPPLY ALL PLANT MATERIALS IN QUALITY AND QUANTITIES SUFFICIENT TO COMPLETE THE PLANTING AS SHOWN ON DRAWINGS.
6. ALL MATERIAL SHALL CONFORM TO THE GUIDELINES ESTABLISHED BY THE CURRENT "AMERICAN ASSOCIATION OF NURSERY STOCK. ANSI Z60.1-1996", PUBLISHED BY THE AMERICAN ASSOCIATION OF NURSERYMAN.
7. NO PLANT SHALL BE PUT INTO THE GROUND BEFORE ROUGH GRADING HAS BEEN FINISHED AND APPROVED.
8. ALL PLANTS SHALL BE PLANTED SO THAT THE ROOT CROWN IS PLANTED AT GRADE LEVEL. ALL TREES PLANTED ON BERM SHALL BE PLANTED AT EXISTING GRADE.
9. ALL PLANTS SHALL BE BALLED AND WRAPPED OR CONTAINER GROWN AS SPECIFIED. NO CONTAINER GROWN STOCK WILL BE ACCEPTED IF IT IS ROOT BOUND. ALL ROOT WRAPPING MATERIAL MADE OF SYNTHETICS OR PLASTICS SHALL BE REMOVED AT THE TIME OF PLANTING. REMOVE TO TOP WIRE FROM TREE BASKET. TWINE OR ROPE SHALL BE REMOVED FROM AROUND CROWN OF TRUNK TO PREVENT GIRDLING OF TREE OR SHRUB.
10. WITH CONTAINER GROWN STOCK, THE CONTAINER SHALL BE REMOVED AND THE CONTAINER BALL SHALL BE CUT THROUGH THE SURFACE IN TWO VERTICAL LOCATIONS.
11. THE DAY PRIOR TO PLANTING, THE LOCATIONS OF ALL TREES AND SHRUBS SHALL BE STAKED FOR APPROVAL BY OWNER(S).
12. THE LANDSCAPE CONTRACTOR SHALL REFER TO CONTRACT SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.
13. THE LANDSCAPE CONTRACTOR SHALL GUARANTEE NEW PLANT MATERIAL THROUGH ONE (1) CALENDAR YEAR FROM THE TIME OF SUBSTANTIAL COMPLETION OF PROJECT.
14. IF THERE IS A DISCREPANCY BETWEEN THE PLANS AND THE PLANT SCHEDULE, THE PLANS SHALL TAKE PRECEDENCE.
15. CONTRACTOR SHALL REPAIR ANY DAMAGE TO PROPERTY FROM PLANTING OPERATIONS AT NO COST TO OWNER.
16. STAKES AND OR GUY WIRES SHALL BE REMOVED AFTER ONE (1) YEAR OF INSTALLATION.
17. ALL EXISTING LANDSCAPING SHALL BE MAINTAINED DURING CONSTRUCTION. ANY MATERIAL DEEMED DEAD OR UNSATISFACTORY BY LANDSCAPE ARCHITECT, WILL BE REPLACED EQUIVALENT IN SIZE AND SHAPE AT NO COST TO OWNER.
18. IF PLANT SPECIES SPECIFIED ARE FOUND TO BE UNAVAILABLE OR NOT IN SUFFICIENT QUANTITIES AT TIME OF PLANTING, THE CONTRACTOR MAY SUBSTITUTE SPECIES UPON WRITTEN APPROVAL BY LANDSCAPE ARCHITECT AND CITY OF MERRILLVILLE.

SYMBOL	DESCRIPTION	1 PLANT QUANTITY / AR PLANT TYPE / FN REQ. LOCATION
ST	STREET FRONTAGE REQUIRED PLANTINGS	
IN	INTERIOR PARCEL REQUIRED PLANTINGS	
PR	PARKING LOT REQUIRED PLANTINGS	

'ST'- STREET FRONTAGE PLANTING TABLE
(1 TREE PER 40 LF OF STREET FRONTAGE)

SYMBOL	LINEAR FEET OF FRONTAGE	TREES REQUIRED	TREES PROVIDED
	U.S. 30. -297 LF	7.425	8- PROPOSED NEW
	MERRILLVILLE DR. -272 LF	6.8	7- PROPOSED NEW

'PR'- PARKING LOT PLANTINGS TABLE
(1 TREE FOR EVERY 2000 SQ.FT. OF PARKING AREA)

SYMBOL	PAVED PARKING AREA	TREES REQUIRED	TREES PROVIDED
	32,723 SQ.FT.	16.36	17

'IN'- INTERIOR PLANTINGS TABLE
(COMMERCIAL USE: 1 TREE AND 5 SHRUBS FOR EVERY 800 SQ.FT. OF GREEN SPACE

SYMBOL	AMOUNT OF OF OPEN SPACE	TREES REQUIRED	TREES PROVIDED	SHRUBS REQUIRED	SHRUBS PROVIDED
	18,166 SQ.FT.	22.70	24*	113.5	114

(*24- TOTAL TREES (17 PARKING PLUS 6 ADDITIONAL TREES AND 1 ADDITIONAL FOR LID MERRILLVILE STORMWATER REQUIRMENT)

UTILITY NOTE:

THE UNDERGROUND UTILITIES SHOWN HAVE BEEN LOCATED FROM FIELD SURVEY INFORMATION AND EXISTING DRAWINGS. THE SURVEYOR MAKES NO GUARANTEES THAT THE UNDERGROUND UTILITIES COMPRISE ALL SUCH UTILITIES IN THE AREA, EITHER IN-SERVICE OR ABANDONED. THE SURVEYOR FURTHER DOES NOT WARRANT THAT THE UNDERGROUND UTILITIES SHOWN ARE IN THE EXACT LOCATION INDICATED ALTHOUGH THE SURVEYOR DOES CERTIFY THAT THEY ARE LOCATED AS ACCURATELY AS POSSIBLE FROM INFORMATION AVAILABLE. THE SURVEYOR HAS NOT PHYSICALLY LOCATED THE UNDERGROUND UTILITIES.

PRIOR TO ANY EXCAVATION FOR UNDERGROUND UTILITIES. CONTRACTOR SHALL EXPOSE AND VERIFY LOCATIONS (HORIZONTAL AND VERTICAL) OF ALL EXISTING UTILITIES INCLUDING BUT NOT LIMITED TO GAS, WATER, AND SANITARY SEWER. ANY CONFLICTS SHALL BE REPORTED IMMEDIATELY TO THE ENGINEER AND THE APPROPRIATE AUTHORITIES. INDIANA 811 ONE-CALL PUBLIC UTILITY LOCATE SERVICE TICKET NUMBER 1508050209 WAS ISSUED FOR THIS PROJECT.

SCALE IN FEET: 0 – 20 – 40

HAND SIGNATURE ON FILE — MATTHEW J. BOONE, REGISTERED No. PE11300218, STATE OF INDIANA, PROFESSIONAL ENGINEER — 02/09/2016

REVISION RECORD

Civil & Environmental Consultants, Inc.
530 E. Ohio Street - Suite G - Indianapolis, IN 46204
317-655-7777 · 877-746-0749
www.cecinc.com

CREW CAR WASH
W. LINCOLN HGWY. & MERRILLVILLE RD.
MERRILLVILLE, INDIANA

LANDSCAPE PLAN

DATE: FEB. 09, 2016 | DWG SCALE: 1" = 20' | DRAWN BY: BEB | CHECKED BY: MJB | PROJECT NO: 150-851 | APPROVED BY: DRAFT

DRAWING NO.: C700

SHEET 08 OF


AMERIPLEX
AT THE CROSSROADS


NATURAL RESTORATION SITE
DO NOT MOW
DO NOT SPRAY
info@williamscreek.net


IBEW LOCAL 697
• BUSINESS OFFICE
• BENEFIT FUNDS
• FEDERAL CREDIT UNION
• ELECTRICAL APPRENTICESHIP & TRAINING CENTER
JATC
UNITED WAY
Lake County Electricians JATC

TAKING IT TO THE STREETS

Grey VS Green

Green Streets will require a variance to get approval…..

Grey vs Green SW Systems

Grey

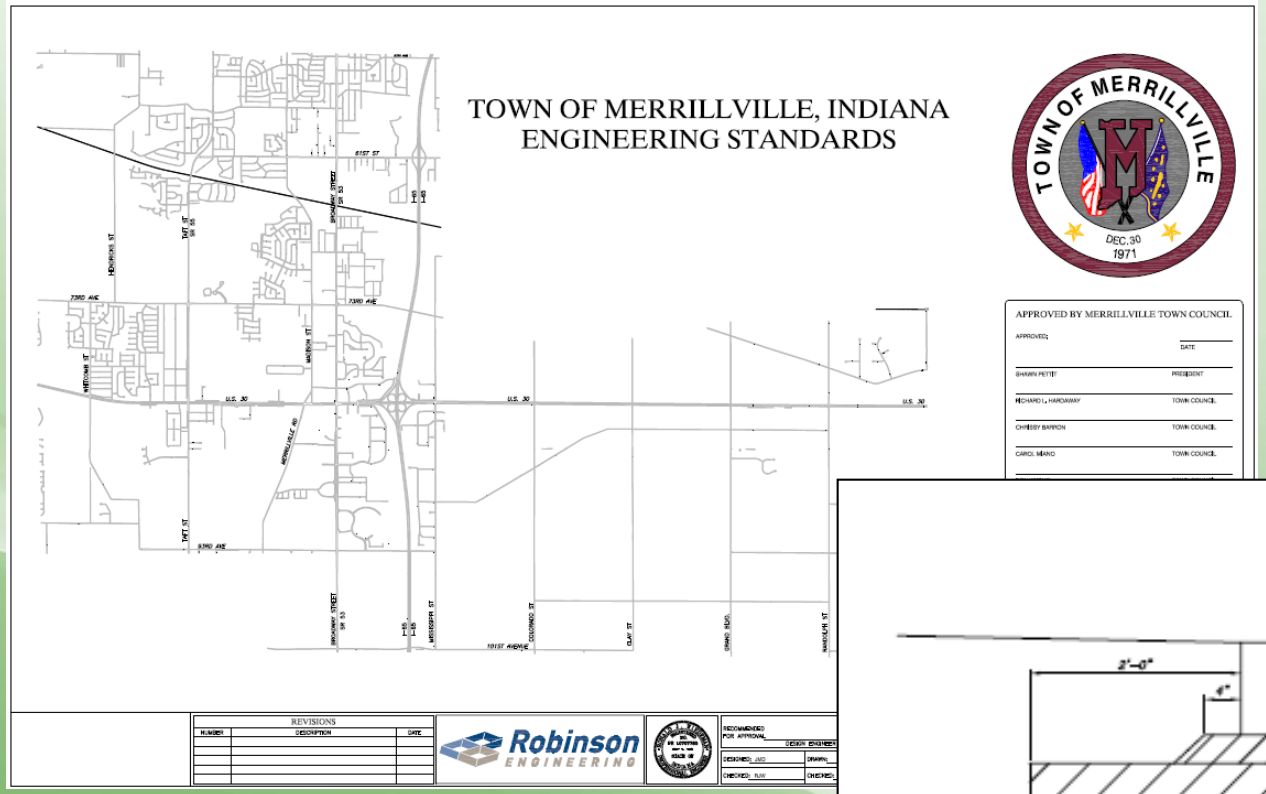
- Curbs
- Inlets
- Pipes
- Vaults
- Basins
- Outfalls

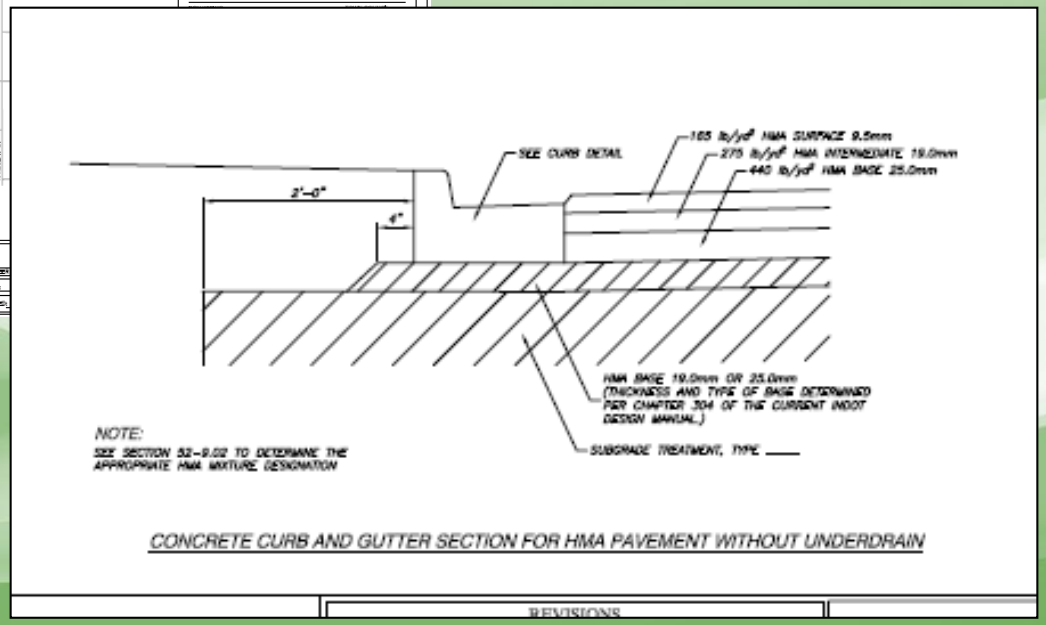
Green

- Swales
- Rain gardens
- Vegetative Buffers
- Wetlands
- Trees

RECEIVING WATERS

Roadway Engineering Standards





A Compilation of Road Projects Using Green Infrastructure

Great Lakes Green Streets Guidebook

Bioretention or Bioswale: Local Road

4 54th Court, Merrillville, IN

(Above) Before reconstruction and (right) after reconstruction of the island on 54th Court.

Project sponsor
Town of Merrillville, Indiana

Project designer
Merrillville Stormwater Utility and Robinson Engineering

Project contractor
Olthoff

Total project cost
$63,000

Key design features

- Design Event: 0.5-inch of runoff
- Drainage Area: < 1 acre
- Runoff Reduction: approximately 29,000 cubic feet
- Soil Modifications: with 50% sand, 25% topsoil, and 25% compost

The Town of Merrillville, Indiana designed a bioretention rain garden in a city-owned island located on 54th Court. The rain garden uses several species of native plants with amended soil to maximize infiltration and evapotranspiration. Additionally, the rain garden is surrounded by a buffer of low-mow fescue. The technique will serve as a demonstration project for future use in other residential areas. Funding was provided by the Town of Merrillville and the Indiana Department of Natural Resources Lake Michigan Coastal Program. Partnerships included the Lake County Soil & Water Conservation District; Merrillville Public Works Department; and local schools, businesses, and residents.

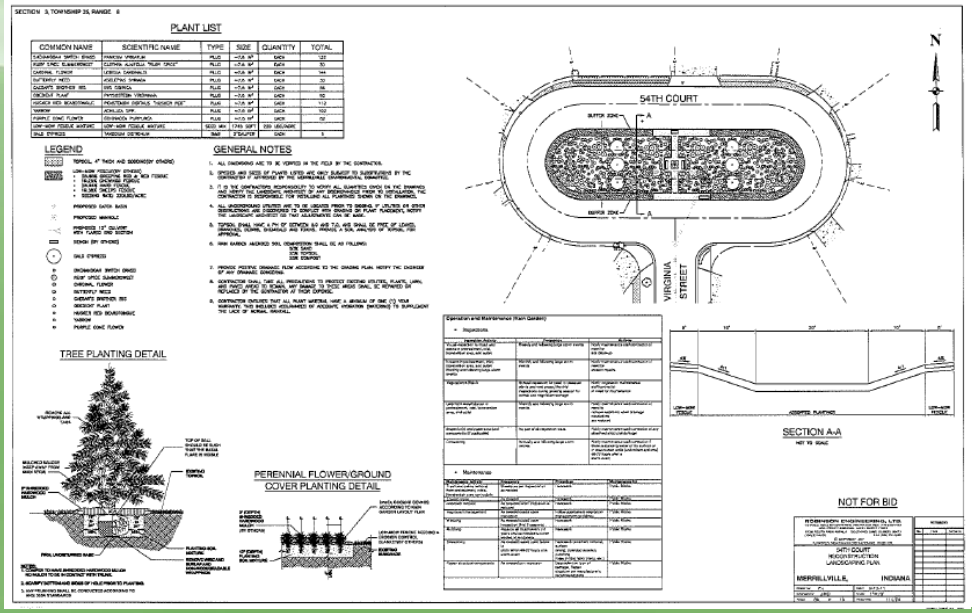
Project benefits
Water quality
Stormwater runoff reduction
Community aesthetics

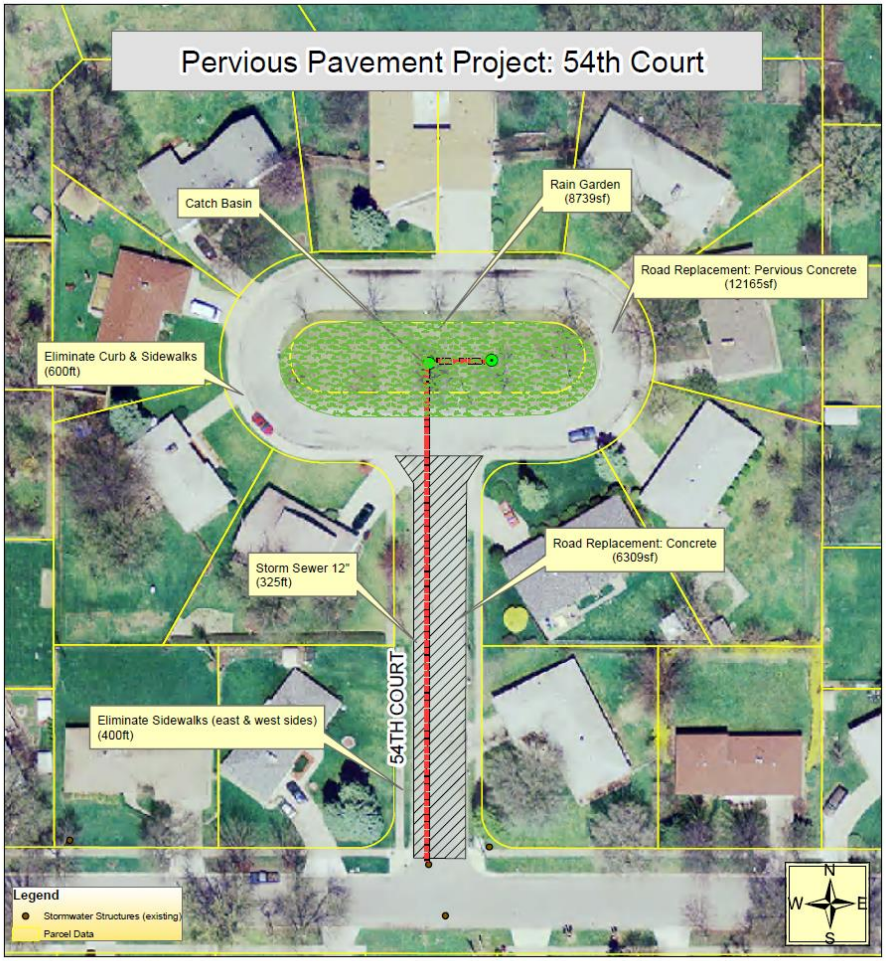
Project challenges
High material costs

Contact Information
Matt Lake
Executive Director,
Merrillville Stormwater Utility
mlake@merrillville.in.gov

Local Green Streets Projects

- Many communities are installing/retrofitting green practices to manage stormwater and increase sustainability of roadways.
- Many are roadway redesign with adjacent rain gardens.
- Public works maintenance will be vastly different.
- How to maintain compared to pre-construction conditions





Town of Merrillville Stormwater Utility

0 40 80 160 240 320 Feet


2011/12/28 01:27 PM

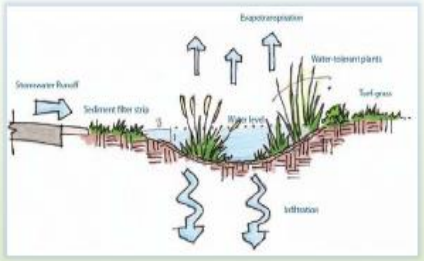

WELCOME TO OUR RAIN GARDEN

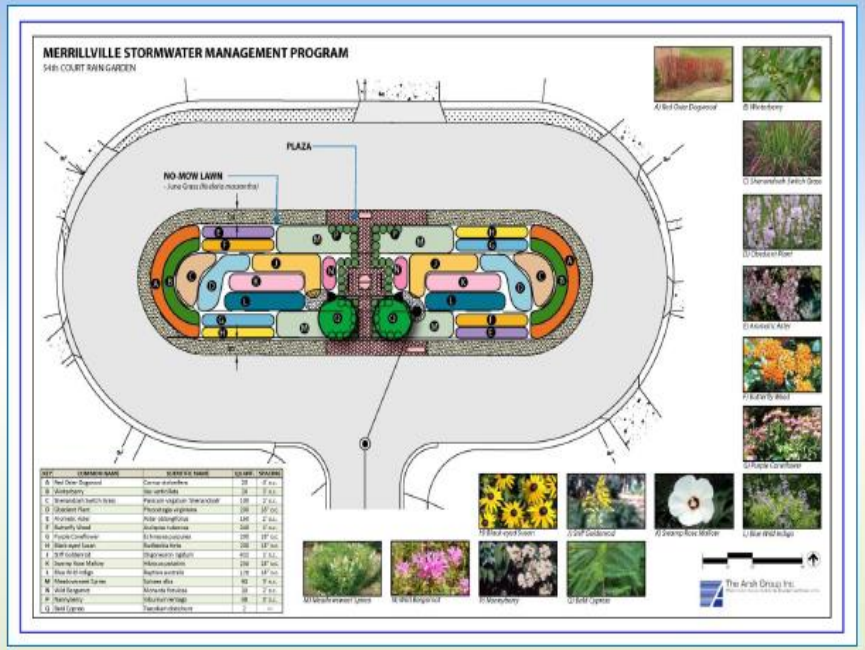
WELCOME TO OUR RAIN GARDEN

Beautiful and Beneficial Merrillville Green Street

What is a Rain Garden?

A rain garden is a bowl-shaped landscape feature that treats stormwater through storage, infiltration and bioremediation. This rain garden uses native perennial plants as natural filters to remove pollutants from stormwater. Our water becomes polluted as it runs off of the surrounding surfaces around you including roofs, driveways, sidewalks and roadways. When you create a rain garden, you can improve local water quality while establishing a beautiful natural area.





About this Project?

This project is a "Green Streets" retrofit design incorporating stormwater management strategies. The surrounding roadway was reconstructed with concrete and sloped towards the rain garden to capture and treat the stormwater. By improving the design of our roadways, we can make them more sustainable, reduce flooding and improve water quality. This project was planted on June 21st 2013 and funded in part by the National Oceanic and Atmospheric Administration and Indiana Department of Natural Resources, Lake Michigan Coastal Program.

Benefits of a Rain Garden?

Rain gardens allow rain and snowmelt to seep naturally into the ground. This helps recharge our groundwater supply and prevents water quality problems caused by polluted runoff. By improving the drainage, the roadway will also last longer reducing the cost of maintenance. Rain gardens are an important way to make our town a more attractive place to live and improve the quality of life.

You Can Also Make a Difference!

- *Plant a rain garden in your yard*
- *Don't over fertilize your lawn*
- *Install a rain barrel to harvest rain water*
- *Properly dispose unwanted automotive fluids*
- *Volunteer to help maintain green projects*
- *Report polluters*
- *Remember "only rain in the drain!"*

TOWN OF MERRILLVILLE — DEC. 18 1971 — STORMWATER UTILITY

Special thanks for funding and donations from our partners!

NOAA · Indiana Lake Michigan Coastal Program · The Arsh Group Inc. Planners, Landscape Architects, Development Consultants, Merrillville, IN 46410, www.arshgroup.com · Lake County Soil and Water Conservation District


MERRILLVILLE STORMWATER RESOURCE CENTER


Rain
Garden

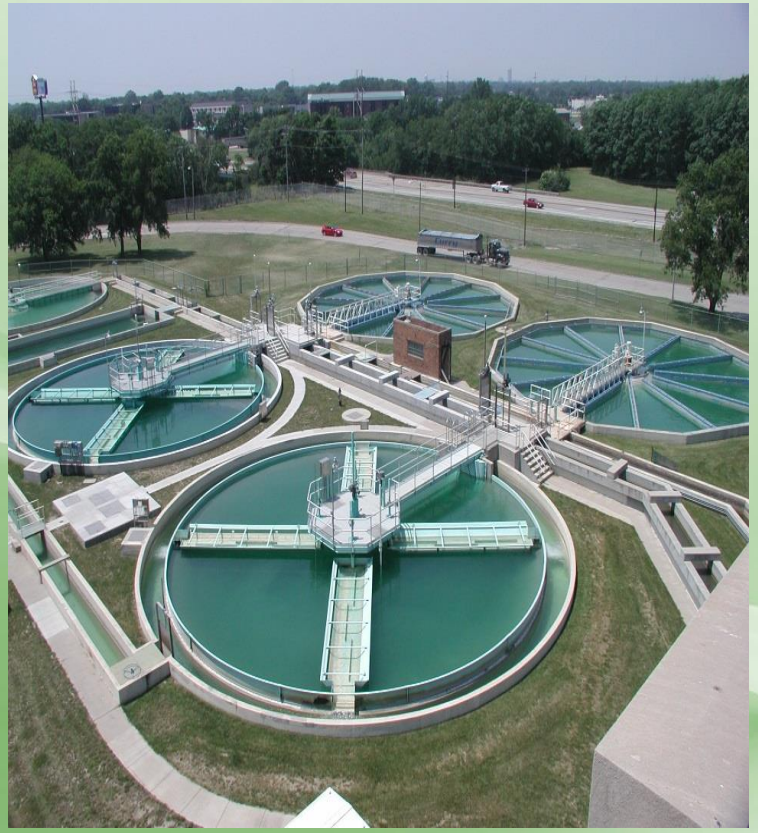

KEEP OUT
STORMWATER
DETENTION ONLY
NO
Swimming - Boating - Fishing
Hunting - Wading - Skating
Anyone violating these rules or anyone littering, vandalizing or damaging Town property will be subject to enforcement action.
IF YOU SEE A VIOLATION, CALL
219-769-3531
Habitat Conservation Area
Grow Zone
Do Not Mow or Disturb
Zones with tall grasses and wildflowers:
Improves water quality with native plants
Provides wildlife habitat
Reduces air emissions/carbon footprint

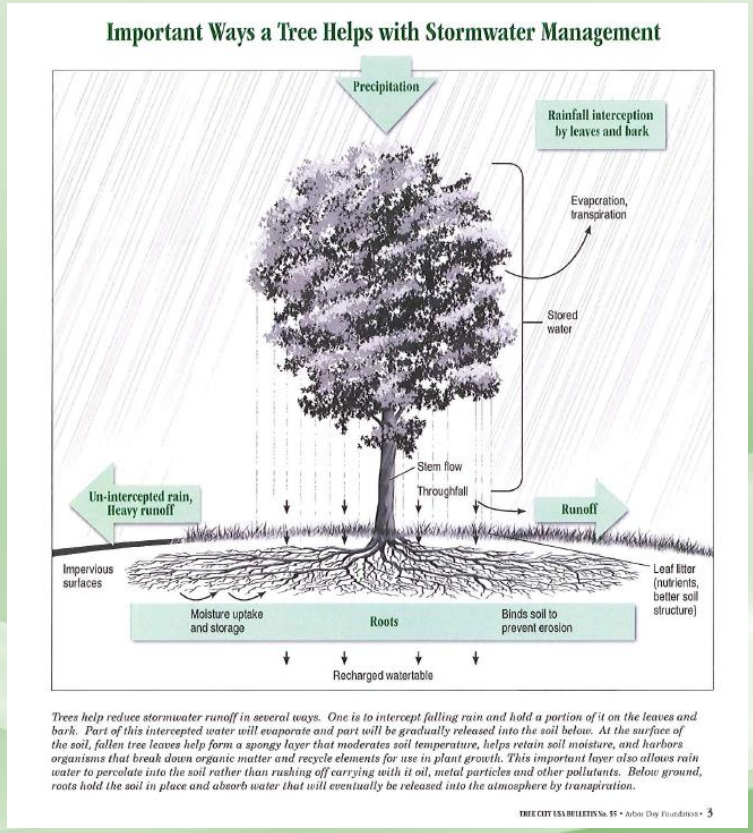
SWS 2018 CONFERENCE & EXHIBITION

LANDSCAPING & URBAN FOREST MANAGEMENT

Water Treatment Plant

- Trees process stormwater naturally through biological processes
- More cost effective to use natural treatment strategies





Quantify Stormwater Benefits

Gallons of Rainfall Interception/Year

Merrillville

Annual Stormwater Benefits of Public Trees by Species

7/27/2012

Species	Total rainfall interception (Gal)	Total ($)	Standard Error	% of Total Trees	% of Total $	Avg. $/tree
Silver maple	6,123,705	165,964	(N/A)	39.7	64.8	53.33
Honeylocust	509,295	13,803	(N/A)	8.0	5.4	21.91
Red maple	201,423	5,459	(N/A)	6.5	2.1	10.70
Callery pear	71,983	1,951	(N/A)	5.9	0.8	4.25
Apple	51,920	1,407	(N/A)	5.8	0.6	3.09
American basswood	229,138	6,210	(N/A)	5.7	2.4	14.02
Green ash	406,743	11,024	(N/A)	5.6	4.3	25.28
Norway maple	227,396	6,163	(N/A)	4.3	2.4	18.34
American elm	377,201	10,223	(N/A)	2.8	4.0	47.33
Spruce	120,186	3,257	(N/A)	2.3	1.3	18.10
Sugar maple	141,489	3,835	(N/A)	1.9	1.5	26.45
White ash	124,111	3,364	(N/A)	1.5	1.3	29.25
Siberian elm	142,333	3,857	(N/A)	1.1	1.5	45.92
OTHER STREET TREES	727,650	19,721	(N/A)	9.2	7.7	27.31
Citywide total	9,454,571	256,237	(N/A)	100.0	100.0	32.67

29 ACRE-FEET/YEAR

Tree Ordinance

- Established **Environmental Resource Committee** as a 5 member advisory review board (volunteers)
- Requires submittal of a Landscaping Plan
- Conservation of Trees During Development Standards
- Restrictions on Tree Planting, Pruning, Maintenance, Vandalism etc.. for Public Trees
- Enforcement

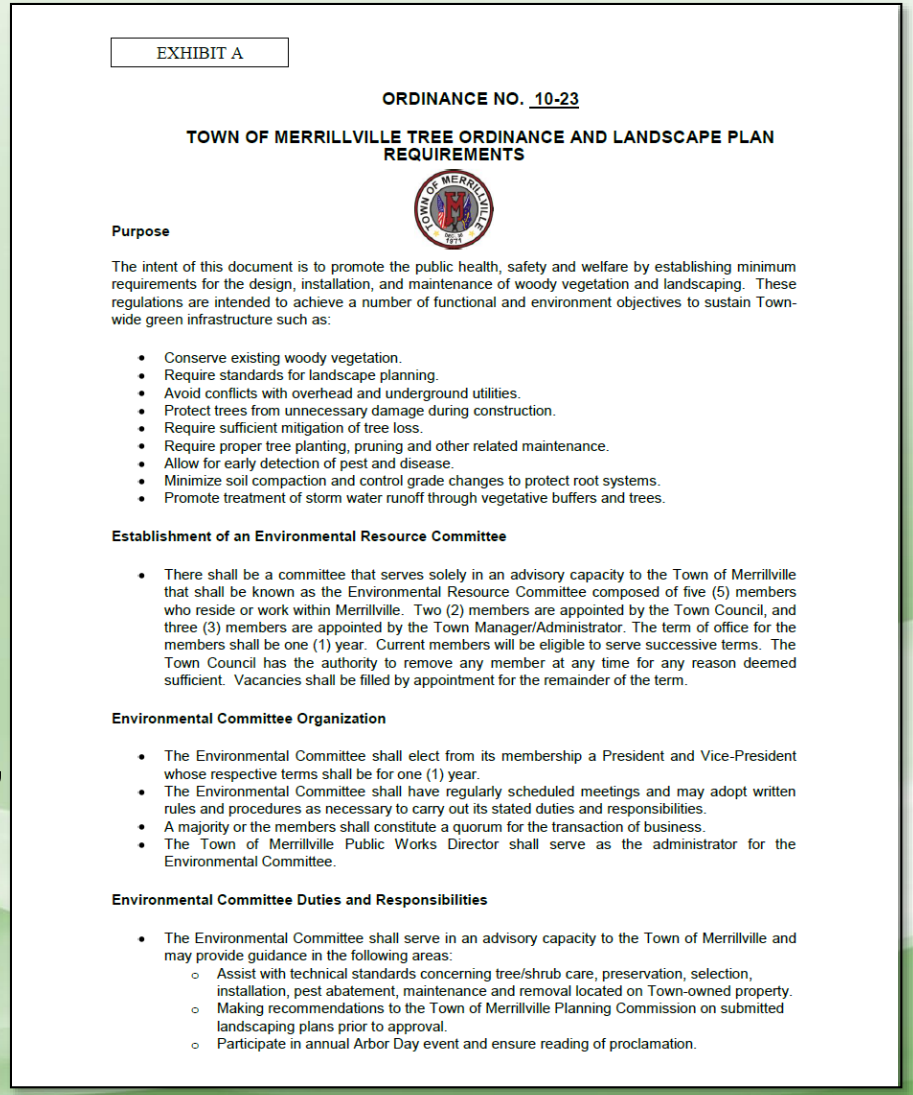


EXHIBIT A

ORDINANCE NO. 10-23

TOWN OF MERRILLVILLE TREE ORDINANCE AND LANDSCAPE PLAN REQUIREMENTS

Purpose

The intent of this document is to promote the public health, safety and welfare by establishing minimum requirements for the design, installation, and maintenance of woody vegetation and landscaping. These regulations are intended to achieve a number of functional and environment objectives to sustain Town-wide green infrastructure such as:

- Conserve existing woody vegetation.
- Require standards for landscape planning.
- Avoid conflicts with overhead and underground utilities.
- Protect trees from unnecessary damage during construction.
- Require sufficient mitigation of tree loss.
- Require proper tree planting, pruning and other related maintenance.
- Allow for early detection of pest and disease.
- Minimize soil compaction and control grade changes to protect root systems.
- Promote treatment of storm water runoff through vegetative buffers and trees.

Establishment of an Environmental Resource Committee

- There shall be a committee that serves solely in an advisory capacity to the Town of Merrillville that shall be known as the Environmental Resource Committee composed of five (5) members who reside or work within Merrillville. Two (2) members are appointed by the Town Council, and three (3) members are appointed by the Town Manager/Administrator. The term of office for the members shall be one (1) year. Current members will be eligible to serve successive terms. The Town Council has the authority to remove any member at any time for any reason deemed sufficient. Vacancies shall be filled by appointment for the remainder of the term.

Environmental Committee Organization

- The Environmental Committee shall elect from its membership a President and Vice-President whose respective terms shall be for one (1) year.
- The Environmental Committee shall have regularly scheduled meetings and may adopt written rules and procedures as necessary to carry out its stated duties and responsibilities.
- A majority or the members shall constitute a quorum for the transaction of business.
- The Town of Merrillville Public Works Director shall serve as the administrator for the Environmental Committee.

Environmental Committee Duties and Responsibilities

- The Environmental Committee shall serve in an advisory capacity to the Town of Merrillville and may provide guidance in the following areas:
  - Assist with technical standards concerning tree/shrub care, preservation, selection, installation, pest abatement, maintenance and removal located on Town-owned property.
  - Making recommendations to the Town of Merrillville Planning Commission on submitted landscaping plans prior to approval.
  - Participate in annual Arbor Day event and ensure reading of proclamation.

Landscape Standards

- Established requirements to get an approved landscaping plan
- Applicants submit plans which are reviewed by the Environmental Committee (ERC)
- ERC provides recommendations to the Plan Commission

EXHIBIT B

TOWN OF MERRILLVILLE LANDSCAPE STANDARDS

Purpose and Intent

Landscaping is necessary for the protection and enhancement of the environment and for the continued vitality of all land uses in the Town. The intent of this Section is to promote the public health, safety and welfare by establishing minimum standards for the design, installation, and maintenance of landscape improvement. The requirements of this section are intended to help achieve a number of functional and environment objectives such as:

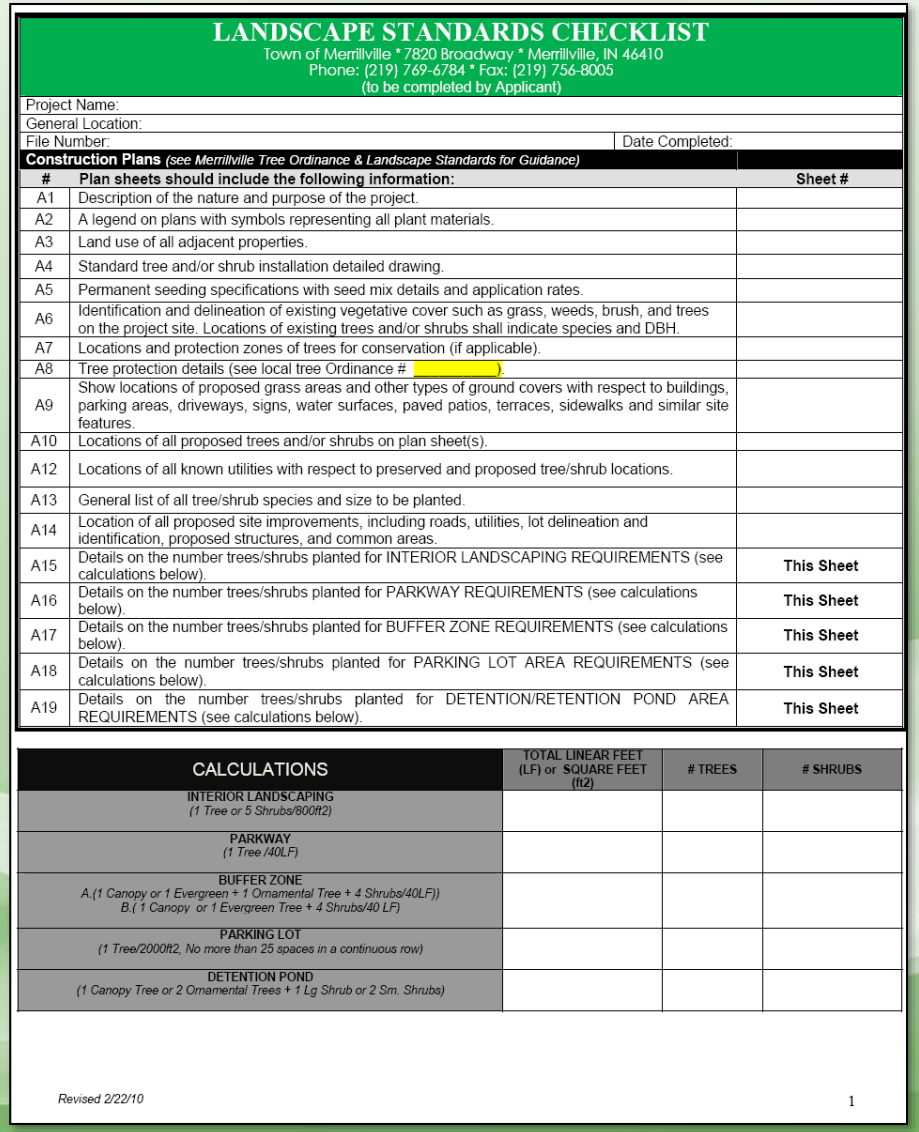
- To promote the implementation of the Town of Merrillville Master Plan and related sub area plans;
- To aid in stabilizing the environment's ecological balance by contributing to the processes of air purification, oxygen regeneration, groundwater recharge, and storm water runoff retardation, while at the same time aiding in noise, glare and heat abatement;
- To encourage the preservation of existing trees and vegetation;
- To provide visual buffering and enhance the beautification of the Town;
- To reduce the physical impact between adjacent land uses by requiring complementary landscape treatments and providing a transitional area adjacent to natural areas;
- Note: This document should be considered as a companion document to the Town of Merrillville Tree Ordinance # 10-23. Whereas the Ordinance contains the majority of the regulatory authority and general requirements, this document contains the necessary means and methods for achieving compliance with the Ordinance. It is intended to serve as a guidance document to assist plan reviewers, developers, and designers achieve the minimum standards. In case there are conflicts between the requirements contained in this document and the ordinance, the requirements of the Tree Ordinance shall prevail.

Scope of Application

- The requirements set forth in this section shall apply to all new development or re-development projects located in the Town of Merrillville following the effective date of this document. No site plan that is reviewed shall be approved unless the site plan shows required landscaping consistent with the provisions of this section.
- Where landscaping is required, a building permit shall not be issued until the required landscape plan is submitted and approved, and a certificate of occupancy shall not be issued unless provisions set forth in this section have been met or cash escrow has been posted in accordance with the provisions set forth in the section.

Plan Review Checklist

- Applicant submits set of plans and completed checklist
- The Environmental Committee will review plans and make a recommendation to the Plan Commission.
- The Committee will hold meetings 1-2 weeks prior to the Plan Commission Meeting.



LANDSCAPE STANDARDS CHECKLIST

Town of Merrillville * 7820 Broadway * Merrillville, IN 46410
Phone: (219) 769-6784 * Fax: (219) 756-8005
(to be completed by Applicant)

Project Name:
General Location:
File Number: Date Completed:

Construction Plans *(see Merrillville Tree Ordinance & Landscape Standards for Guidance)*

#	Plan sheets should include the following information:	Sheet #
A1	Description of the nature and purpose of the project.	
A2	A legend on plans with symbols representing all plant materials.	
A3	Land use of all adjacent properties.	
A4	Standard tree and/or shrub installation detailed drawing.	
A5	Permanent seeding specifications with seed mix details and application rates.	
A6	Identification and delineation of existing vegetative cover such as grass, weeds, brush, and trees on the project site. Locations of existing trees and/or shrubs shall indicate species and DBH.	
A7	Locations and protection zones of trees for conservation (if applicable).	
A8	Tree protection details (see local tree Ordinance #).	
A9	Show locations of proposed grass areas and other types of ground covers with respect to buildings, parking areas, driveways, signs, water surfaces, paved patios, terraces, sidewalks and similar site features.	
A10	Locations of all proposed trees and/or shrubs on plan sheet(s).	
A12	Locations of all known utilities with respect to preserved and proposed tree/shrub locations.	
A13	General list of all tree/shrub species and size to be planted.	
A14	Location of all proposed site improvements, including roads, utilities, lot delineation and identification, proposed structures, and common areas.	
A15	Details on the number trees/shrubs planted for INTERIOR LANDSCAPING REQUIREMENTS (see calculations below).	This Sheet
A16	Details on the number trees/shrubs planted for PARKWAY REQUIREMENTS (see calculations below).	This Sheet
A17	Details on the number trees/shrubs planted for BUFFER ZONE REQUIREMENTS (see calculations below).	This Sheet
A18	Details on the number trees/shrubs planted for PARKING LOT AREA REQUIREMENTS (see calculations below).	This Sheet
A19	Details on the number trees/shrubs planted for DETENTION/RETENTION POND AREA REQUIREMENTS (see calculations below).	This Sheet

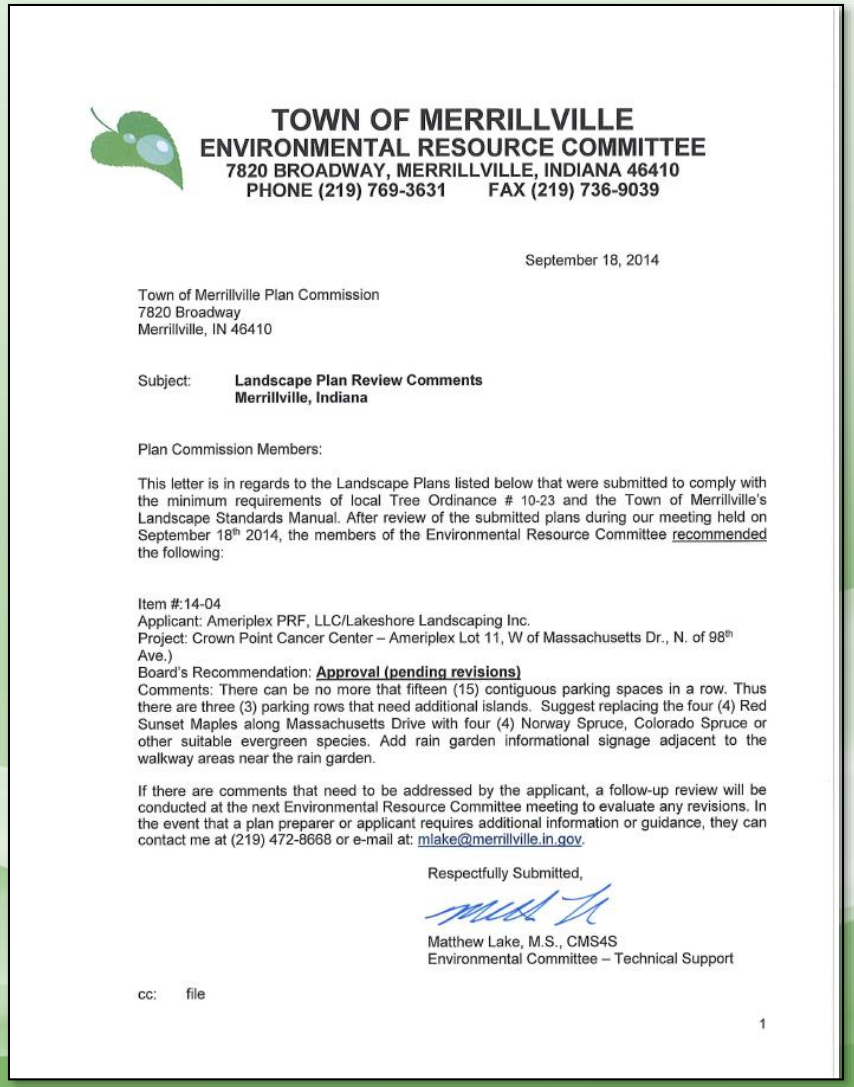
CALCULATIONS	TOTAL LINEAR FEET (LF) or SQUARE FEET (ft2)	# TREES	# SHRUBS
INTERIOR LANDSCAPING *(1 Tree or 5 Shrubs/800ft2)*			
PARKWAY *(1 Tree /40LF)*			
BUFFER ZONE *A.(1 Canopy or 1 Evergreen + 1 Ornamental Tree + 4 Shrubs/40LF)) B.(1 Canopy or 1 Evergreen Tree + 4 Shrubs/40 LF)*			
PARKING LOT *(1 Tree/2000ft2, No more than 25 spaces in a continuous row)*			
DETENTION POND *(1 Canopy Tree or 2 Ornamental Trees + 1 Lg Shrub or 2 Sm. Shrubs)*			

Revised 2/22/10

1

Environmental Resource Committee

- ERC meets monthly and review landscape plans for new and re-development projects.
- Recommendations from ERC are sent to Plan Commission for final approval.



TOWN OF MERRILLVILLE
ENVIRONMENTAL RESOURCE COMMITTEE
7820 BROADWAY, MERRILLVILLE, INDIANA 46410
PHONE (219) 769-3631 FAX (219) 736-9039

September 18, 2014

Town of Merrillville Plan Commission
7820 Broadway
Merrillville, IN 46410

Subject: **Landscape Plan Review Comments**
Merrillville, Indiana

Plan Commission Members:

This letter is in regards to the Landscape Plans listed below that were submitted to comply with the minimum requirements of local Tree Ordinance # 10-23 and the Town of Merrillville's Landscape Standards Manual. After review of the submitted plans during our meeting held on September 18th 2014, the members of the Environmental Resource Committee recommended the following:

Item #:14-04
Applicant: Ameriplex PRF, LLC/Lakeshore Landscaping Inc.
Project: Crown Point Cancer Center – Ameriplex Lot 11, W of Massachusetts Dr., N. of 98th Ave.)
Board's Recommendation: **Approval (pending revisions)**
Comments: There can be no more that fifteen (15) contiguous parking spaces in a row. Thus there are three (3) parking rows that need additional islands. Suggest replacing the four (4) Red Sunset Maples along Massachusetts Drive with four (4) Norway Spruce, Colorado Spruce or other suitable evergreen species. Add rain garden informational signage adjacent to the walkway areas near the rain garden.

If there are comments that need to be addressed by the applicant, a follow-up review will be conducted at the next Environmental Resource Committee meeting to evaluate any revisions. In the event that a plan preparer or applicant requires additional information or guidance, they can contact me at (219) 472-8668 or e-mail at: mlake@merrillville.in.gov.

Respectfully Submitted,

Matthew Lake, M.S., CMS4S
Environmental Committee – Technical Support

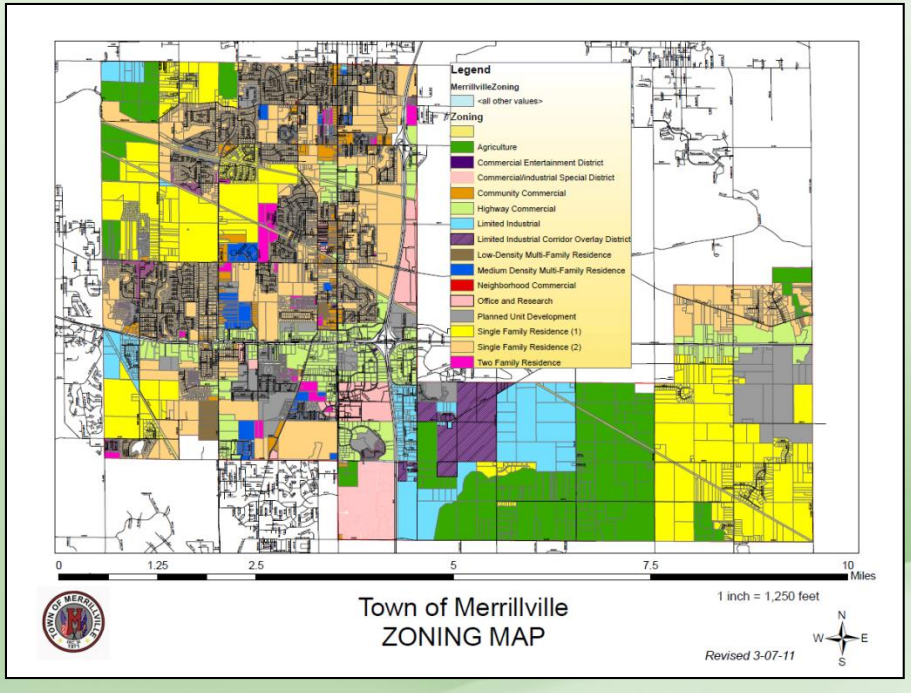
cc: file

1

NO IMPACT DEVELOPMENT

Natural Area Conservation

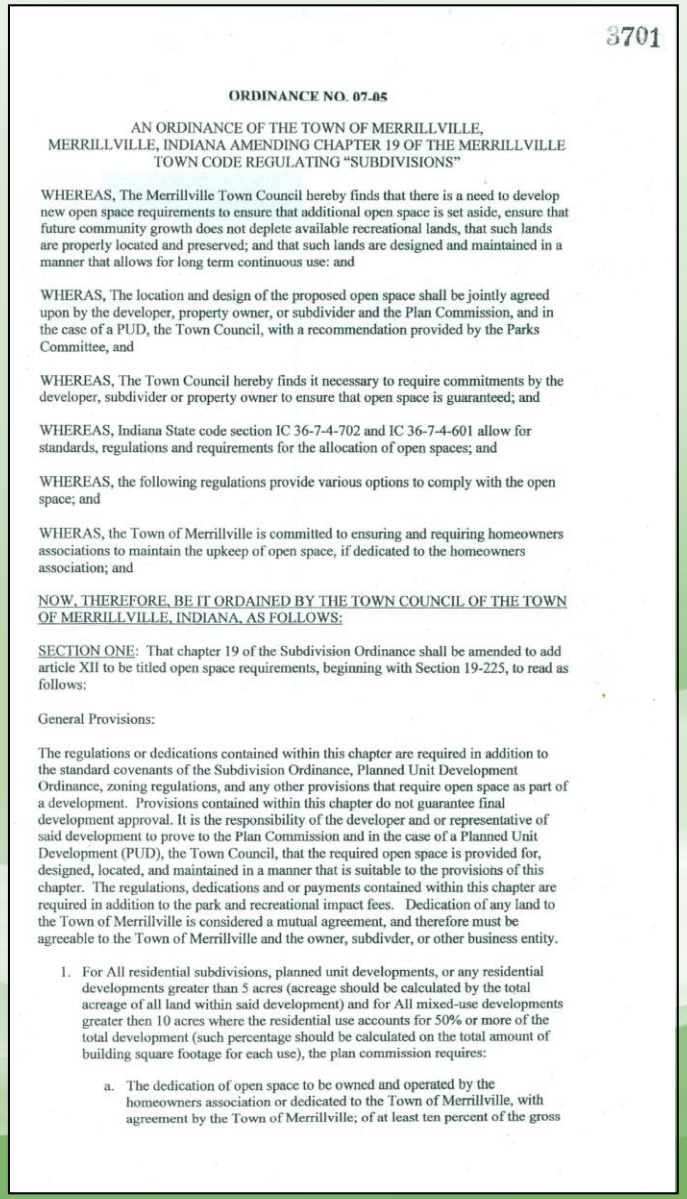
The best way to mimic pre-development conditions to reduce runoff is to not develop…..



- Land Trusts
- Open Space Ordinance
- Conservation Easements
- Land Acquisition for Passive Parks/Forest Preserves

Open Space Ordinance

- Applies to all residential subdivisions or PUDs
- Dedicates at least 10% of gross land area
- Cannot be detention, wetland, ROW or easement
- Must be contiguous
- Native landscaping encouraged
- Shall preserve important habitats for fish, wildlife, flora and significant trees.



3701

ORDINANCE NO. 07-05

AN ORDINANCE OF THE TOWN OF MERRILLVILLE, MERRILLVILLE, INDIANA AMENDING CHAPTER 19 OF THE MERRILLVILLE TOWN CODE REGULATING "SUBDIVISIONS"

WHEREAS, The Merrillville Town Council hereby finds that there is a need to develop new open space requirements to ensure that additional open space is set aside, ensure that future community growth does not deplete available recreational lands, that such lands are properly located and preserved; and that such lands are designed and maintained in a manner that allows for long term continuous use: and

WHERAS, The location and design of the proposed open space shall be jointly agreed upon by the developer, property owner, or subdivider and the Plan Commission, and in the case of a PUD, the Town Council, with a recommendation provided by the Parks Committee, and

WHEREAS, The Town Council hereby finds it necessary to require commitments by the developer, subdivider or property owner to ensure that open space is guaranteed; and

WHEREAS, Indiana State code section IC 36-7-4-702 and IC 36-7-4-601 allow for standards, regulations and requirements for the allocation of open spaces; and

WHEREAS, the following regulations provide various options to comply with the open space; and

WHERAS, the Town of Merrillville is committed to ensuring and requiring homeowners associations to maintain the upkeep of open space, if dedicated to the homeowners association; and

NOW, THEREFORE, BE IT ORDAINED BY THE TOWN COUNCIL OF THE TOWN OF MERRILLVILLE, INDIANA, AS FOLLOWS:

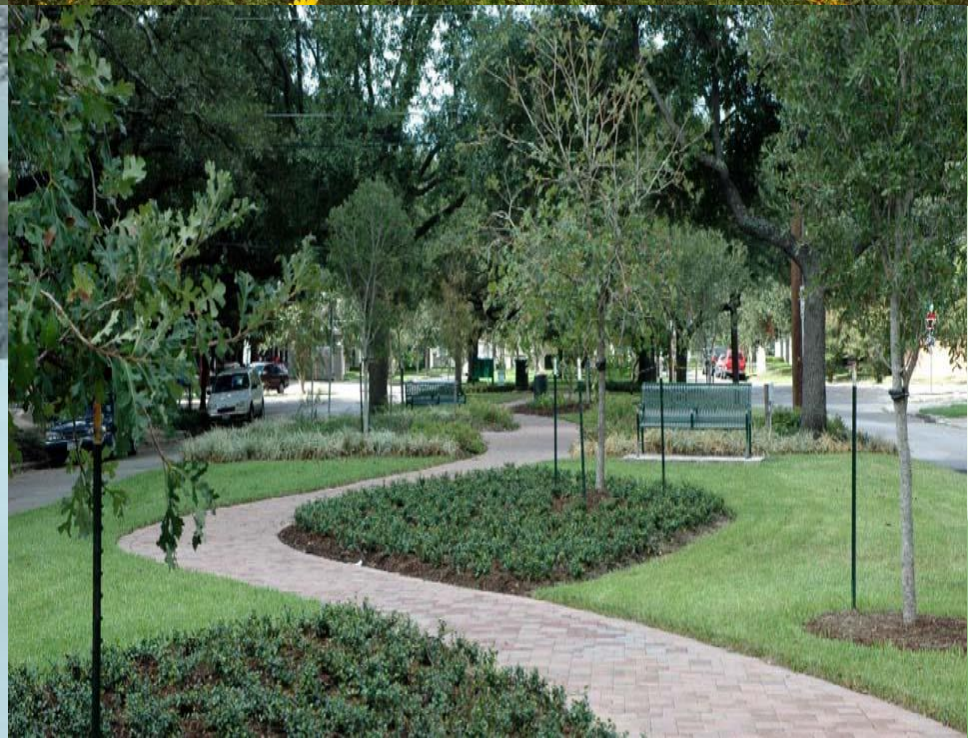
SECTION ONE: That chapter 19 of the Subdivision Ordinance shall be amended to add article XII to be titled open space requirements, beginning with Section 19-225, to read as follows:

General Provisions:

The regulations or dedications contained within this chapter are required in addition to the standard covenants of the Subdivision Ordinance, Planned Unit Development Ordinance, zoning regulations, and any other provisions that require open space as part of a development. Provisions contained within this chapter do not guarantee final development approval. It is the responsibility of the developer and or representative of said development to prove to the Plan Commission and in the case of a Planned Unit Development (PUD), the Town Council, that the required open space is provided for, designed, located, and maintained in a manner that is suitable to the provisions of this chapter. The regulations, dedications and or payments contained within this chapter are required in addition to the park and recreational impact fees. Dedication of any land to the Town of Merrillville is considered a mutual agreement, and therefore must be agreeable to the Town of Merrillville and the owner, subdivder, or other business entity.

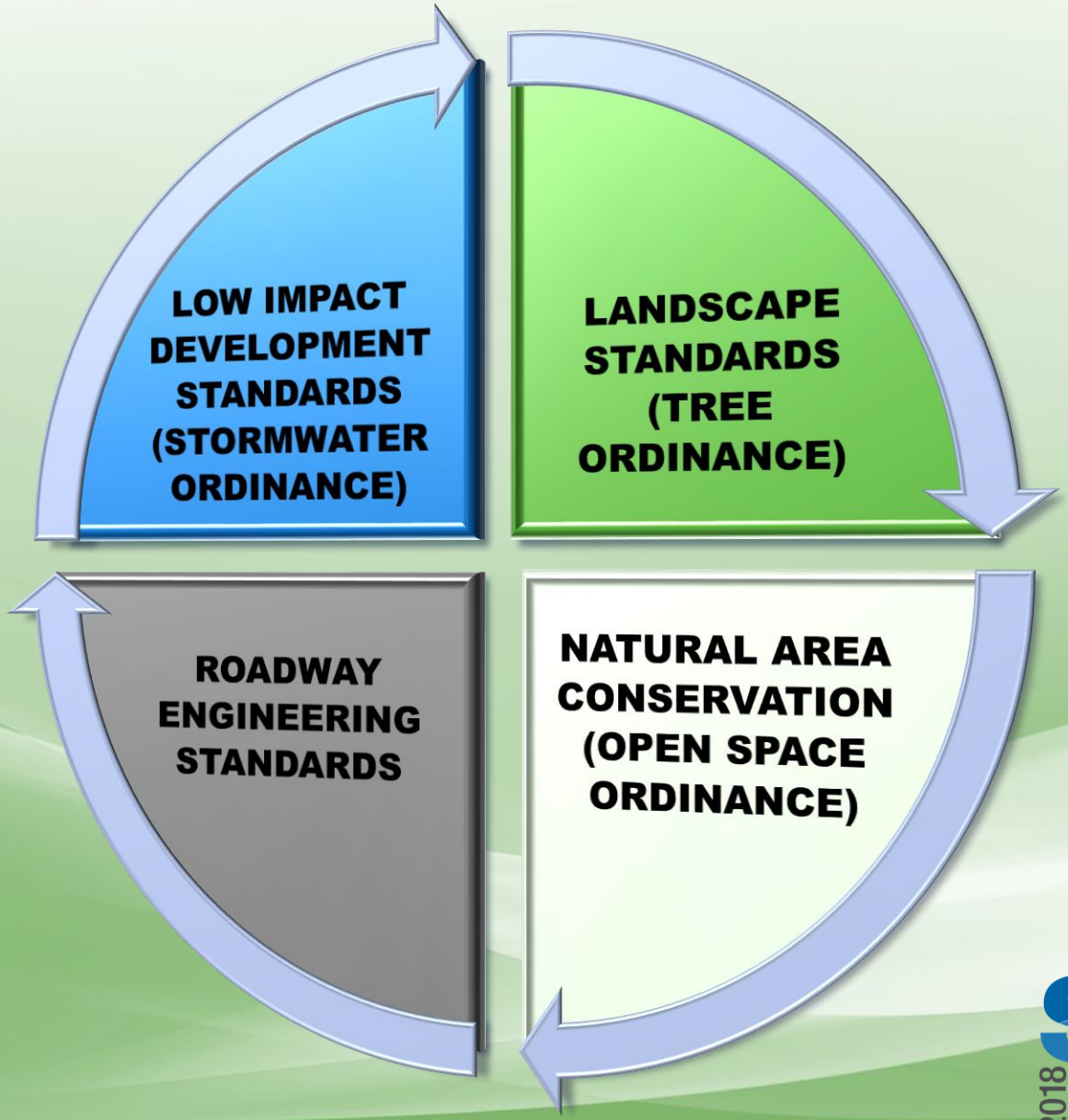
1. For All residential subdivisions, planned unit developments, or any residential developments greater than 5 acres (acreage should be calculated by the total acreage of all land within said development) and for All mixed-use developments greater then 10 acres where the residential use accounts for 50% or more of the total development (such percentage should be calculated on the total amount of building square footage for each use), the plan commission requires:

    a. The dedication of open space to be owned and operated by the homeowners association or dedicated to the Town of Merrillville, with agreement by the Town of Merrillville; of at least ten percent of the gross



BRINGING IT ALL TOGETHER

Implementation Full Circle



SWS 2018 CONFERENCE & EXHIBITION

RECYCLED MATERIALS

New Recycled Pipe Standards

- The Merrillville Stormwater Utility implemented a new standard for town-owned stormwater infrastructure projects by incorporating pipe that contains at least 40% recycled high-density polyethylene (HDPE)

- Designed to meet 100+ year service

Recycled Pipe Stats

One manufacturer recycles Over 400 Million lbs. of HDPE

One 20' stick of 48'' (40%) recycled pipe

- **uses over 240 lbs. of recycled HDPE**
- **conserves 82 gallons of oil**
- **conserves 3.6 cubic yards of landfill space**


TOWN OF MERRILLVILLE
DEC. 30
1971
STORMWATER
UTILITY


TOWN OF MERRILLVILLE
DEC. 30
1971
STORMWATER
UTILITY


TOWN OF MERRILLVILLE
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UTILITY
PIERCE ST
DELTA III
DOOSAN


TOWN OF MERRILLVILLE
DEC. 30 1971
STORMWATER UTILITY
DOOSAN
NO PARKING
POLICE ORDERS

Recycled Material for HDPE Pipe

Post Consumer Recycled Materials

- Materials From Products that Have Served a Previous Consumer Purpose
- Can Be Provided in Flake or Reprocessed Pellets

Infrastructure Improvements

- **Merrillville has over 6,000 inlets and over 800,000 feet of storm drains that are continuously maintained.**
- **We continue to invest in new infrastructure throughout the town to manage stormwater quantity & quality.**

Sustainable Solutions

Service Life

Milk Jug = less than 6 Months

Service Life

HDPE Pipe = more than100 years

Proper Burial for HDPE

Let’s not bury problems in landfills but create solutions!

TAKING ACTION

Next Steps 1,2,3

Consultants/Engineers

- Market LID to clients, develop new ordinances/standards
- Offer local workshops on LID for developers and elected officials

Department Heads

- Talk to elected officials/decision makers (don't overwhelm them)
- Get support of other department heads

Elected Officials

- Pass new ordinances
- Take credit for all the positive outcomes

SWS 2018 CONFERENCE & EXHIBITION

Reducing Stormwater Costs through Low Impact Development (LID) Strategies and Practices

Benefits of Low Impact Development

EPA

How LID Can Protect Your Community's Resources

LID Barrier Busters Fact Sheet Series

What Is Low Impact Development (LID)?

LID includes a variety of practices that mimic or preserve natural drainage processes to manage stormwater. LID practices typically retain rain water and encourage it to soak into the ground rather than allowing it to run off into ditches and storm drains where it would otherwise contribute to flooding and pollution problems (see www.epa.gov/nps/lid).

A green roof absorbs rainwater, reduces energy costs and offers wildlife habitat in urban Portland, Oregon.

Why Should My Community Adopt LID?

LID Reduces Stormwater Runoff by Emphasizing Infiltration

As a community grows, so does the amount of surface area covered by parking lots, roads and rooftops (Figure 1). Rainfall cannot soak through these hard surfaces; instead, the rain water flows quickly across them—picking up pollutants along the way—and enters ditches or storm drains, which usually empty directly and without treatment into local waterways. Local streams in urban areas are overwhelmed by frequent urban flash flooding and stream habitats are smothered by sediments carried by the excessive flows.

Contrast this to an undeveloped watershed, where vegetation-covered soil soaks up rainfall rather than allowing it to run off the land (Figure 2). Water filters through the soil before reaching the groundwater table or being released slowly into streams. An undeveloped watershed provides clean, safe water.

Fortunately, by adding LID solutions, communities can help their watersheds act more like undeveloped watersheds—despite the ever-expanding numbers of roads and rooftops. LID practices such as natural or man-made swales, depressions and vegetated areas capture and retain water onsite, allowing time for water to soak into the soil where it is naturally filtered.

Figure 1. When roads, rooftops and parking lots cover much of the land, more than half of the rainfall runs off and flows directly into surface waters. In highly developed areas, such as in Seattle, Washington (above left), only 15 percent of rain water has the opportunity to soak into the ground.

Figure 2. When vegetation and natural areas cover most of the land, such as in Oregon's Upper Tillamook Bay watershed (above left), very little water (only 10 percent) runs off into surface waters. Nearly half of the rainfall soaks into the soil. The remaining water evaporates or is released into the air by vegetation.

EPA United States Environmental Protection Agency

January 2013

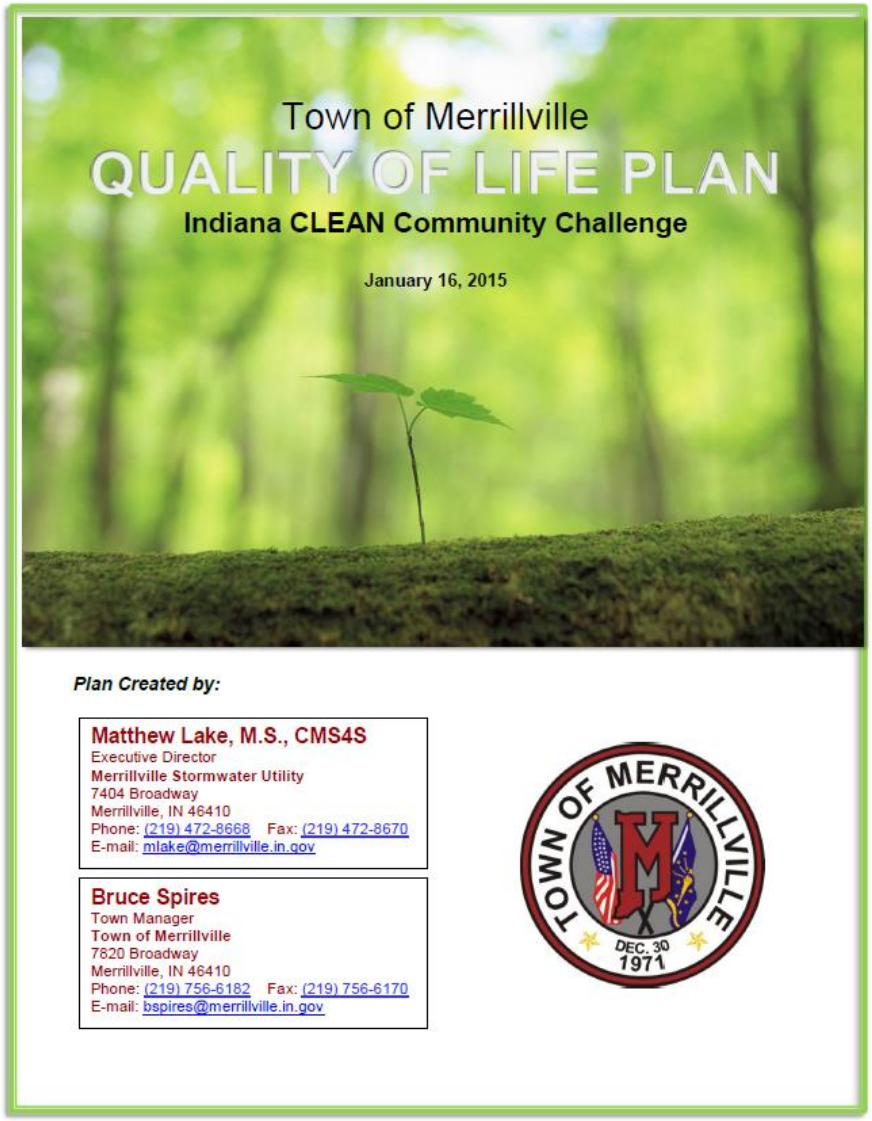
Rainwater Harvesting

Conservation, Credit, Codes, and Cost

OPPORTUNITIES FOR TREATMENT AND STORAGE

IDEM Clean Community

- Merrillville applied to become an IDEM Clean Community
- Set goals to improve the quality of life
- Voluntary recognition program that recognizes and rewards Indiana communities for proactively managing environmental impacts associated with governmental operations



Tree City USA

- Have been a designated Tree City USA for 6 years
- Arbor Day event provides opportunities for education and outreach activities that emphasize trees & stormwater

Stormwater Master Plan

- Finalized New Stormwater 20-Year Master Plan
- Conducted drainage studies for each sub-watershed area
- Identified and prioritized capital improvement projects estimated **over 24 million dollars**

- Meadowdale Lateral Subwatershed - $3,887,694.60
- Kaiser Ditch Subwatershed - $8,357,638.80
- Chapel Manor Subwatershed - $8,674,335.00
- North Central Turkey Creek Subwatershed - $1,662,824.10
- Northeast Turkey Creek Subwatershed - $2,328,060.00
- **TOTAL - $24,910,552.50**

Land Use	TSS	TP	TKN	NH3-N	BOD	COD	Lead	Zinc	Cu
Commercial	1000	1.5	6.7	1.9	62	420	2.7	2.1	0.4
Parking Lot	400	0.7	5.1	2.0	47	270	0.8	0.8	0.04
High Density Residential	420	1.0	4.2	0.8	27	170	0.8	0.7	0.03
Medium Density Residential	190	0.5	2.5	0.5	13	72	0.2	0.2	0.14
Low Density Residential	10	0.04	0.03	0.02	NA	NA	0.01	0.04	0.01
Freeway/Interstate	880	0.9	7.9	1.5	NA	NA	4.5	2.1	0.37
Industrial	860	1.3	3.8	0.2	NA	NA	2.4	7.3	0.50
Park/Open Space	3	0.03	1.5	NA	NA	2.0	0.0	NA	NA
Construction	6000	80	NA	NA	NA	NA	NA	NA	NA

Table 5. Typical Pollutant Loadings from Runoff by Urban Land Use (lbs/acre-yr). ***EPA, Honer et al, 1994***

Questions?