SEPT. 22, 2022
PROJECT NO. – 2018-012

WASAGA RIVERWOODS
OPERATIONS AND MAINTENANCE REPORT

TOWN OF WASAGA BEACH

CAPES ENGINEERING

355310 BLUE MOUNTAINS-EUPHRASIA TOWNLINE
CLARKSBURG, ON N0H 1J0

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1.0 Introduction

CAPES Engineering Ltd. has been retained by Wasaga Riverwoods Homes to prepare a functional servicing and stormwater management report in support of a Site Plan Agreement for the 0.66a ha (0.987 ha total size but only 0.661 ha to be developed) site located on River Road West in the Town of Wasaga Beach.

This Operations and Maintenance Manual has been prepared for the Owner to provide a comprehensive maintenance program for the site servicing and features as per the Town of Wasaga Beach Engineering Standards.

2.0 Site Location

The Wasaga Riverwoods Development is located on the south side of River Road West, west of Westbury Rd. and east of Beck Street. The Treetop Condominium site is located east of the site separated from the property by a 6.0 m wide stormwater management block owned by the Town. The south end of the Holiday Trailer Park campground is located on the north side of River Road West across from the site.

3.0 Watermain Distribution System

The proposed residential apartment building is to be connected to an existing 150 mm dia. watermain stub on River Road West. Please refer to **Appendix A** for the engineering drawings of the site showing the watermain connection.

There are no private watermain valves or hydrants within the property limits but the owner is responsible for any repairs and maintenance of the watermain connection between the building and the main watermain line on River Road West.

The watermain connection is to be installed as per Town of Wasaga Beach Engineering Standards in coordination with Public Works and Engineering by a Town approved contractor in the presence of Municipal water/sewer staff and/or Town Engineer.

As per the Town standards the testing procedures for the watermain connection at construction are as follows.

The Developer's consultants and/or contractor shall produce and provide a comprehensive proposed swabbing, chlorination, and pressure testing procedures and plan. Testing is to be undertaken by a qualified third-party company approved by the Town. The consultant is to provide a written proposal regarding how the testing is to be conducted in keeping with current standards seven (7) days prior to testing.

All watermains shall be tested, swabbed, flushed and disinfected in accordance with current OPSS.MUNI 441 specifications. A minimum of three (3) swabs are to be used per line. Insertion of the swabs is to be witnessed by Town staff at the time of swabbing. Pressure testing shall be completed for maximum 300m length test sections. All proposed testing procedures and processes are to be provided

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in writing with specific details to the Engineering and Public Works Department for review and approval prior to commencement of any testing works.

Hypochlorite for disinfecting shall be NSF certified for all watermain works.

The procedures for disinfecting watermains shall be in accordance with the latest revision of AWWA C651. The Developer shall arrange the watermain test and shall inform the Town Engineer when a section has completed a satisfactory pre-test for leakage testing and is ready for the final leakage testing inspection. A minimum of 48 hours notice is required prior to testing for the Town Engineer to coordinate with Public Works staff for operation of valves. Any sections failing the test shall be repaired and retested at the Developer's expense.

Two series of bacteriological tests are to be conducted in accordance with AWWA C651 after residual chlorine level testing and system flushing to re-establish municipal system chlorine levels. The AWWA C651-14 revision indicates that the purchaser has two options for bacteriological testing for total coliform analysis as follows:

"Option A: Before approving a main to go into service, take an initial set of samples and then resample again after a minimum of 16 hr using the sampling site procedures outlined (in the AWWA Standard). Both sets of samples must pass for the main to be approved to go into service."

"Option B: Before approving a main to go into service, let it sit for a minimum of 16 hr without any water use. Then collect, using the sampling site procedures outlined (in the AWWA Standard) and without flushing the main, two sets of samples a minimum of 15 min apart while the sampling taps are left running. Both sets of samples must pass for the main to be approved to go into service."

The Developer / contractor is responsible to arrange for a certified technician to obtain water samples for bacteriological testing. Bacteriological testing shall be undertaken by an accredited laboratory and the results shall be in accordance with the Ministry of the Environment Guidelines.

Prior to connecting new watermain to the municipal distribution system, the Developer must provide satisfactory bacteriological test results to the Town Engineer. An approved, qualified third party shall take the test samples with Town staff present to witness sampling. Samples are to be sent to an approved laboratory, which is to be confirmed in writing to the satisfaction of the Town.

The Town requires a copy of the chain of custody report for file.

In the event that the final connection is not made within ten (10) days of the Town providing notification. The Town will take a residual chlorine reading. If the residual reading has fallen below 0.05mg/L the Town will require additional flushing and sampling of the water system prior to final connection.

In addition to the above and annual report prepared by a certified inspector is required to be prepared and submitted to the Town Public Works Department confirming that all backflow prevention devices have been inspected, tested and certified in accordance with MECP and OBC requirements.

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4.0 Sanitary Collection System

The site has a 200 mm dia. sanitary sewer connection to the Municipal sewage system located on River Road West. A sanitary manhole has been provided at the property line for this connection for access, inspection and clean-out. Please refer to **Appendix A** for the engineering drawings which illustrate the sanitary service connection.

The sanitary sewer manhole at the property line is the only sanitary sewer manhole for the site, there are no other internal sanitary manholes or sewer lines. This manhole shall be inspected twice annually and in the event of a blockage a CCTV inspection should be completed to determine the nature of the blockage.

The Owner is responsible for any maintenance and repairs of the sewer line between the building and the main sewer line located on River Road West.

5.0 Storm Sewer System

There are no storm sewers within the limits of the development property.

6.0 Stormwater Management Facility

The stormwater management quantity and quality control method for the site is limited to the Permeable Paving System in the parking and driving lane area.

Full details of the SWM design are described in the Servicing and Stormwater Design Brief prepared by CAPES Engineering Ltd. dated Sept. 2022.

This report outlines maintenance responsibilities, inspection, and procedures in accordance with the current Ministry of the Environment (MOECP) Stormwater Management Planning and Design Manual (2003), the Nottawasaga Valley Conservation Authority (NVCA) Stormwater Technical Guide (2013) and the Town of Wasaga Beach Engineering Standards (2021).

The entire parking and driving area on the site are constructed with a permeable paving system.

These pavers have an open seam around the concrete blocks which allow precipitation to infiltrate into the sandy subsurface soils. The advantage of this type of system is that the stormwater management of the site is distributed over a larger area, precipitation is added to the groundwater system more rapidly and there should be no runoff from the site if the system is working properly.

In the winter months permeable pavers reduce or eliminate the build up of ice on the surface reducing or eliminating the need for sand and salt. Ice will form in a typical asphalt or concrete parking area as the sun warms the surface turning any accumulated snow into a liquid which may or may not be able to drain away along the surface depending on the site conditions. Any water that can't runoff then refreezes into ice.

With permeable pavers the melted snow on the surface drains directly down through the open graded system and infiltrates away reducing or eliminating the requirement for sand and salt application.

Refer to **Appendix C** for the manufacturer's recommendations for maintenance and to **Appendix A** for the Engineering drawings.

A visual inspection should be completed at least once a year to review any areas where sediment is building up between the paving blocks.

If water is not draining through the permeable paver system sediment should be swept or blown off the surface or in the case of excessive build up a vacuum sweeping truck should be used. The concrete blocks could also be lifted, the area cleaned out and the blocks reset.

It is not recommended to heavily sand and salt the site, but de-icing compounds can be used if needed.

It is also recommended that the site be plowed using a rubber edged blade or one with small lifters. If any blocks are lifted by the blade, then simply reset the blocks into the recess.

7.0 Snow Storage Removal

Designated areas for snow storage have been shown on the engineering drawings in **Appendix A**. Please note that snow storage can be accommodated in the designated areas of the site, however care should be taken to not pile excessive amounts of snow on sensitive trees, plants and shrubs. Snow should ideally be stored in the designated areas, open spaces between trees and shrubs and in grassed areas.

If excessive volumes of snow have accumulated on site, it may be required to haul the snow off site by a private snow removal contractor.

8.0 Pavement Markings

As per the Town standards all pavement markings as shown on the engineering drawings in **Appendix A** will need to be repainted at minimum once per year. However, with the permeable paving system the Owner may opt to use differing coloured paving blocks to delineate the noted surface pavement markings. If the Owner opts for differing coloured blocks, then yearly painting will not be required.

9.0 Landscaping

A landscaping plan has been prepared for the site including planting details and care. Please refer to **Appendix D** for the landscaping plan.

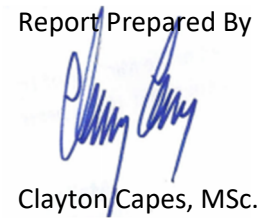
Grass should be mowed as needed in keeping with Town property standard By-Laws and grass clippings should not be blown onto the permeable paving system as this will lead to premature clogging of the paving system.

Replacement of dead, dying or diseased plant material shall be as per the approved landscaped plan.

10.0 Summary and Conclusions

This report has identified the maintenance responsibilities and procedures required to efficiently maintain the Wasaga Riverwoods infrastructure. A site maintenance checklist has been provided in **Appendix B** for use by the Owners in tracking the maintenance activities.

Report Prepared By



Clayton Capes, MSc. P.Eng.

CAPES Engineering Ltd.

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Appendices

Appendix A –Engineering Drawings

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Appendix B – Inspection Checklist

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Wasaga Riverwoods – Town of Wasaga Beach
SWM & LID Monitoring Checklist

Date:

	Item	Maintenance Required (Y/N)	Comments
Permeable Paving System			
1.	Check for trash/debris/sediment accumulation and remove as required by sweeping, leaf blower or in the case of excessive sediment build up and lack of drainage on the surface a vacuum sweeping truck.		

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Appendix C – Permeable Paver Installation and Maintenance

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ECORASTER®

Permeable Ground Reinforcement

Installation manual

ECORASTER®

Disclaimer

The explanations in this document, particularly application and usage recommendations of our products, are based on our experience and knowledge under normal conditions, and assume that the products have been stored and used appropriately. Due to differences in subsoils and local conditions Purus cannot warranty an installation based on verbal instructions or the guidelines printed in this manual. Local experts should be consulted. Terms and conditions apply. Subject to change without notice.

Thanks for going permeable!

The consequences of global use of land surface are noticeable and emphasize the urgent need for permeable ground reinforcement solutions

Since the year 2000, in Germany alone 100 hectares of land are sealed every day by construction and roadbuilding. Worldwide it is even worse.

PURUS PLASTICS operates one of the most modern plastics recycling facilities in the world. Our goal: manufaturing truly sustainable products.

ECORASTER® products have been developed and produced in Germany from 100% recycled materials (LDPE) since 1994.

ECORASTER® is absolutely 100% environmentally friendly, time proven with millions of square meters sold, and is versatile and excellent value.

With the right choice of grid types and well-designed accessories, this system is suitable for almost every type of application.

Choosing our quality products help to save precious resources and reduces the environmental impact of waste plastics. Your benefits: You will save money and time during installation, on maintenance and usage.

Your PURUS PLASTICS Team

*(Quelle: StBA 2014)

Installation Manual **ECORASTER®**

Contents

CIVIL ENGINEERING | ROAD CONSTRUCTION | MUNICIPAL CONSTRUCTION | LANDSCAPE GARDENING | MILITARY | SPECIAL CIVIL ENGINEERING | PRIVATE AND PUBLIC SPACE

Why ECORASTER®?

Particularly in metropolitan and industrial areas, because the ground is paved or compacted it is less able to fulfill its natural functions. On one hand the ground loses the natural ability to store or "buffer" rain water which can lead to very quickly over-burdening storm water infrastructure leading to flooding, and on the other hand the air cannot be cooled and humidified by the natural ground "perspiring", contributing to the well-known "Heat Island Effect".

To counteract this trend and to help to prevent the negative effects of traditional sealed paving, more and more municipalities, architects and civil engineers are designing permeable and vegetated paving systems - a wise and affordable investment.

Using the ECORASTER® system, in comparison to sealed surfaces, saves costly storm water retention ponds and other drainage and infrastructure systems. Often storm water taxes can also be saved and grants may be available to help implement alternative paving options such as the ECORASTER® system.

ECORASTER® installation is quick and simple without the use of expensive mechanical equipment. The paved area is filled with gravel or vegetated and remains permeable.

Compared with heavy ioncrete pavers ECORASTER® is easy and economical to transport and has ultra-high load bearing capacity (up to 800 t / m^2). The 95% open surface is significantly more permeable and allows a much higher degree of infiltration. In contrast to the concrete pavers ECORASTER® does not absorb water, which prevents frost damage and increases the infiltration capacity.

The proven safety interlocking system and the integral expansion joints create excellent surface weight distribution and resistance to dynamic loading , no matter what kind of application the system is be used for.

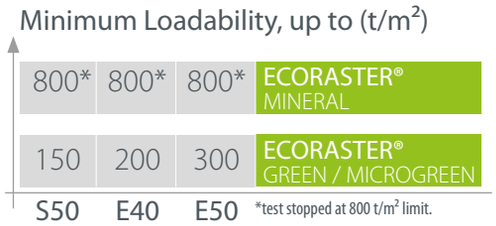
Benefits at a glance.

- ✓ easy and quick installation (up to 100 m^2| 1,076 ft^2/h per person)
- ✓ high resilience (up to 800 t/m^2)
- ✓ low maintenance
- ✓ installation without heavy construction equipment
- ✓ no edging needed
- ✓ permeable ground reinforcement
- ✓ low transport and handling costs
- ✓ versatile applicable, accessories available
- ✓ weatherproof and unbreakable
- ✓ Safety interlocking, 36 notches per m^2
- ✓ UV-resistant and frostproof
- ✓ 20 years warranty
- ✓ „Made in Germany" (TÜV Nord)

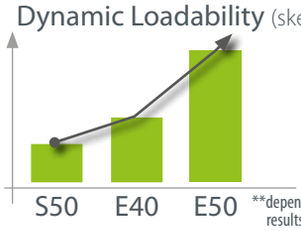
Matrix of Application

ECORASTER® Application			GREEN / MICROGREEN vegetated	MINERAL gravel filled
Load		Roads and paths used only for pedestrians and bicycles may use this	E40 alternative: S50	E40 alternative: S50
		Paths, walkways and similar applications, as well as car parking	E40 alternative: E50 or S50	E40 alternative: E50
		Roads, road shoulders and parking lots used for all types of vehicles	E50	E50* alternative: ECORASTER® STONE
		Areas used with high point axle loading e.g. warehousing (forklifts and trucks), truck parking lots, bus parking, helicopter landing pads.	---	E50* alternative: ECORASTER® STONE *with 3/8" - 3/4" inches covering-over
	Installed and unfilled, the **ECORASTER®** system can be driven on with heavy wheeled vehicles (EN 124 / D400 except Bloxx).			

Minimum Loadability, up to (t/m²)



Dynamic Loadability (sketched)**



Certificates and Approvals

- UV-resistant, certified DIN EN 60068-2-5
- Point axle loading up to 20 t/m², DIN 1072:1985
- Heavy-duty, tried and tested DIN EN 124:2011
- Environmentally safe, tested OECD 202:2004
- Factory warranty: 20 years from purchase date (private use)
- NATO certified E50 - MOD / 9330-99-858-1406
- TÜV CERT
- TÜV Nord „Made in Germany"

Please note: Please read the manual/ check our website for more information!

1m² = 10.764 ft²

Occupancy and parking duration

Installation examples for permeable areas

Dependent on daily occupancy and parking duration

ECORASTER® Mineral ECORASTER® Stone

Occupancy > 10 h per day

» visitor parking
» shopping malls (near mall entrances)
» driveways, entrances and exits, access roads
» storage areas
» fire rescue paths, fire access lanes ... and much more

parking time > 10 h per day

ECORASTER® Bloxx

Occupancy > 10 h per day

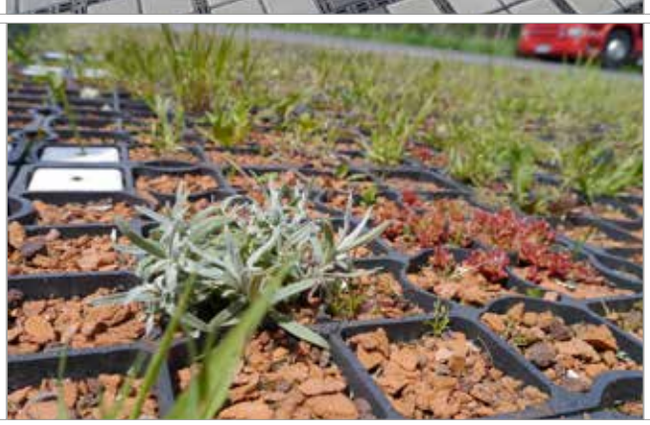
» high traffic areas
» accessible parking space, public sector, etc.
» office buildings, public buildings, commercial areas
» shopping malls, parks
» parking areas in residential districts ... and much more

parking time > 10 h per day

ECORASTER® Microgreen

Occupancy max. 8 h per day

» parking space, public sector, etc.
» office buildings, public buildings, commercial areas
» shopping malls, parks
» parking areas in residential districts ... and much more



parking time max. 8 h per day

ECORASTER® Green

Occupancy max. 4 h per day

» parking spaces in tourist areas
» office and commercial areas (overflow)
» paths for golf carts, etc.
» cemeteries
» fire access lanes
» stadiums and sporting areas (located non inner-city)
» campsites ... and much more

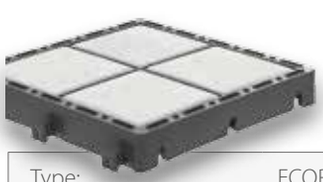
parking time max. 4 h per day

Adapt to the intensity of use:
Parking lots and driveways can be planned according to their distance from the building.

20 YEAR warranty ECORASTER®

Specifications

Type:	ECORASTER® E50	ECORASTER® S50	ECORASTER® A50	ECORASTER® E40
Dimensions:	330 x 330 x 50 mm 12.99 x 12.99 x 1.97 inches	330 x 330 x 50 mm 12.99 x 12.99 x 1.97 inches	330 x 330 x 50 mm 12.99 x 12.99 x 1.97 inches	330 x 330 x 40 mm 12.99 x 12.99 x 1.57 inches
Material:	100% recycled LDPE			
Wall height:	50 mm • 1.97 inches	50 mm • 1.97 inches	50 mm • 1.97 inches	40 mm • 1.57 inches
Wall thickness:	5 mm • 0.1968 inches	2,5 mm • 0.098 inches	5 mm • 0.1968 inches	3,6 mm • 0.14 inches
Loadability:	up to 800 t/m² (depending on fill type)			
Interlock:	36 notched connectors per m²			
Dimensional stability:	-50° / 90 ° C • -58° / 194° F			
Change in shape:	0.5% (at normal temperature +68°F to 176°F)			
Moisture absorption:	0,01% • 0.01%			
Solubility:	resistant to acids, alkalis, alcohol, oil and petrol (de-icing salt, ammonia, acid rain, etc.)			
Compressive strength:	up to 20t point axle load (DIN 1072)			
Area per pallet:	57,19 m² • 615.59 ft²	57,19 m² • 615.59 ft²	57,19 m² • 615.59 ft²	73,15 m² • 787.38 ft²
Weight per piece:	1,06 kg • 2.34 lbs	0,76 kg • 1.67 lbs	1,06 kg • 2.34 lbs	0,58 kg • 1.27 lbs
Weight per m² | 10.76 ft²:	9,55 kg • 21.05 lbs	6,84 kg • 15.07 lbs	9,55 kg • 21.05 lbs	5,22 kg • 11.50 lbs



Type:	ECORASTER ® Bloxx
Dimensions:	330 mm x 330 mm x 50 mm 12.99 X 12.99 x 1.97 inches
Weight:	approx. 85 kg | 187.39 lbs (incl. blocks)
Locking System:	36 T-elements /m² 6 T-elements/ sqft
Dimensional Stability (Temperature):	-50° to +90 ° C -58° F to +194°F
Block Dimensions:	140 x 140 x 45mm (each) 5.51 x 5.51 x 1.77 inches
Weight per Block:	approx. 2.12 kg | 4.67 lbs
Available Colours:	red, white, dark grey and light grey

Questions? Give us a call:
+1 800 495 55 17

Info: 1m² = 10.76 ft²

Check the water permeability

What are the criteria for infiltration?

The infiltration rate of the ground affects the feasibility of a construction project involving water-permeable surfaces. It is indicated by the coefficient of permeability K (m/s). To be considered for such a project, the infiltration rate of the ground must be tested. Geotechnical surveys are required for certain surfaces to be reinforced or for heterogeneous ground.

$K > 10^{-4}$ m/s	$10^{-4} > K > 10^{-6}$ m/s	$10^{-6} > K > 10^{-8}$ m/s
stony / sandy soil	**sandy / clay soil**	**clay / loam**
		
quick infiltration	**average infiltration**	**slow infiltration**
		safety drainage 

A possible test method to establish infiltration capability

For this quick test dig out a circular area with a of 40 cm diameter and 40 cm depth. Fill 10 liters of water and measure the time it takes the water to fully infiltrate into the soil. Repeat this process until the same approximate time is measured 3 times in a row. The test should be done in the natural undisturbed soil, so as not to distort the results.

Evaluation of test results (in minutes):

time of infiltration ≤ 2	2 < time of infiltration ≤ 20	infiltration > 20
QUICK	AVERAGE	SLOW

Determination of requirements: Sand, gravel etc.

Before determining your requirements of gravel, loose gravel etc., please determine the height of your area.
For larger areas we recommend using leveling instruments or laser technology.

To calculate the material required to fill up the ECORASTER® elements please use the following formula:

0,95 x area x height of ECORASTER®

Installation without substructure?

Thanks to the interlocking system and the excellent area load balancing ECORASTER® can be installed without substructure. If you do not use a substructure (water-storing bed) area drainage is not ensured. Additionally soil variations can effect surface irregularities and cause different loadabilities.

If you plan to install without substructure please contact us we are eager to help you.

Please keep in mind!

» ECORASTER® should be installed with a vibrating plate tamper after installation (Bloxx with rubber mat).

» For the final height of the substructure please note, that the ECORASTER® settles into base layer approx. 0.5cm | 0.19“

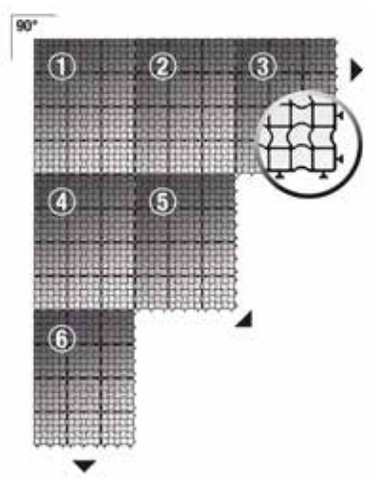
» After filling ECORASTER® a slight settlingt is possible. For Bloxx use a geotextile (mesh) to avoid mixing gravel and floor.

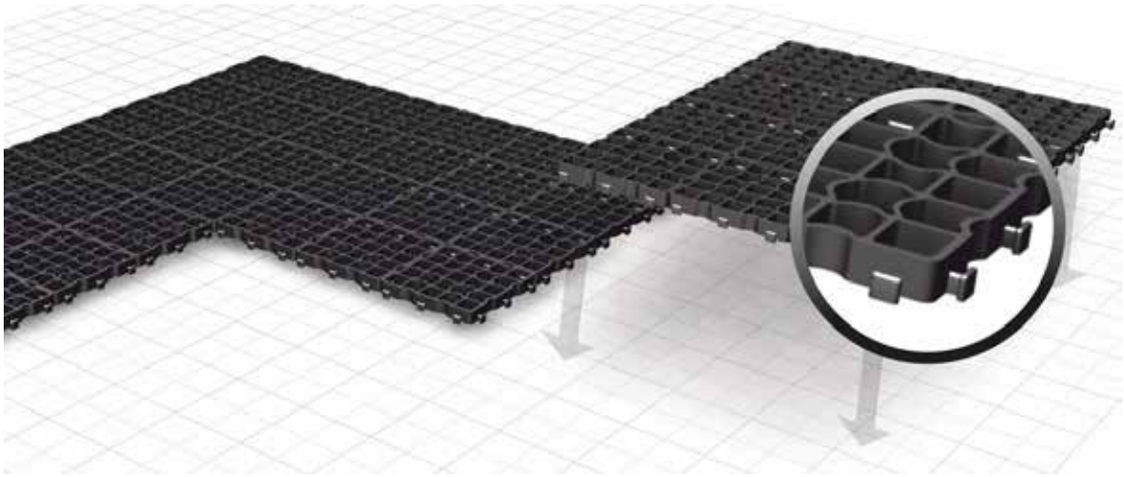
» In hot conditions please fill the ECORASTER® elements immediately after correct installation.

» For areas mainly used by heavy trucks and forklifts (small turning radius), we recommend using ECORASTER® E50 with 1 - 2 cm | 3/8“ - 3/4“ over fill, e.g. with loose gravel. Alternatively ECORASTER® E50 Stone (resin-bound) can be installed.

Installing the pre-assembled layers

ECORASTER® can be installed quickly and easily without heavy construction equipment. The elements are delivered in "layers". One layer is equal to 1.33 m^2 | 14.32 ft^2 and consists of 12 single ECORASTER® pieces (4x3). Large areas can be installed in a single operation directly from the pallet as the weight of a layer is low and the interlocking system works quickly and easily.





Installation

Start the installation at a corner of the area. Make sure the interlocking notches point outwards towards the direction of the further area to be installed. The next layers are simply connected to the notches of the already installed ECORASTER® elements. To achieve a straight result, we recommend using a guideline along the outside of the area.

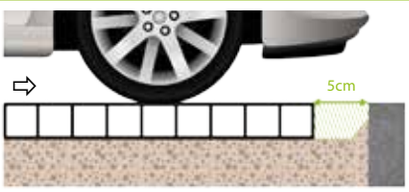
Disassembly

The pre-assembled layers can be disconnected if needed. Put the layer you want to separate on top of another layer, the edge along the area you want to split up. Push the upper layer (the one you want to separate) down using your foot. Enough force will loosen the safety interlocking system notches.

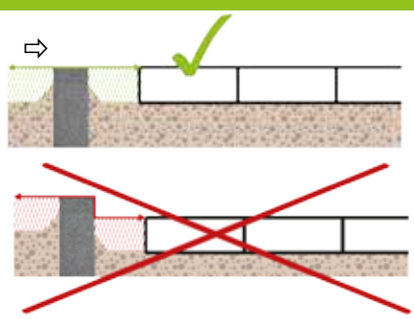
Adapt – cut to size

For quick and clean cutting of ECORASTER® the following tools have proven themselves in practice:

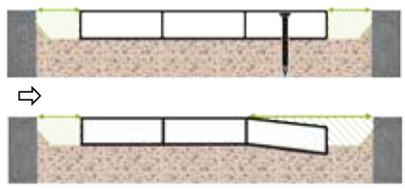
- » portable circular saw
- » cutting disc
- » jigsaw
- » crosscut saw



Please ensure that that you keep 5 cm | 2 inches of space is kept between ECORASTER® and edging*



Please place ECORASTER® on the same level like the edging.*



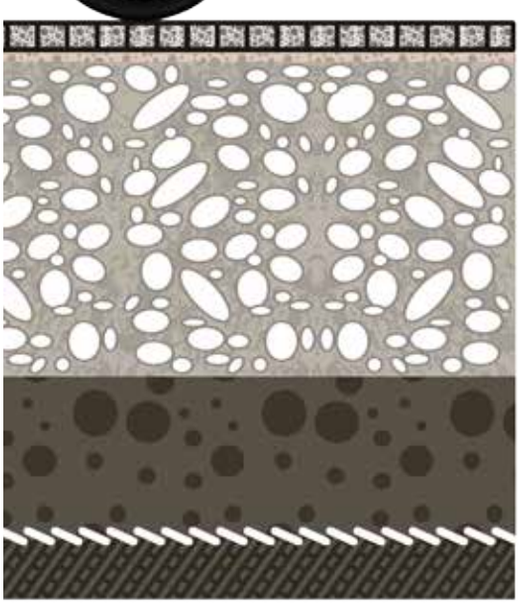
To prevent rising or lifting due to braking forces in parking areas, ECORASTER® can be anchored with ground nails.
Alternatively the end of the system can be lowered as shown.*

*driving direction from left to right.

Example: Parking with ECORASTER® **MINERAL**

Filling: Gravel

Areas, which can not be greened because of the heavy use or their insufficient location, can be filled with loose gravel. These areas are also considered to be fully permeable! Due to the high loadability this type of filling is highly recommended for heavy duty areas such as parking or warehouse/logistic areas.



ECORASTER® — Filling;
Fill with gravel/ loose gravel/ sand (with proper grain size, no fines)

Base layer

Levelling course, 1/4“ (chip or similar);
Approx. 4-5 cm levelled, then install ECORASTER® and plate tamp or roll to compact

Draining layer — Drainage layer 20 cm clear angular gravel (e.g. 0/32mm | 3/4“);
Fill with gravel and compact

Substructure — 10 to 45 cm gravel (e.g. 30/60 or 40/80mm | 1 1/2“) ;
For cars approx. 25 cm • Truck approx. 40 cm

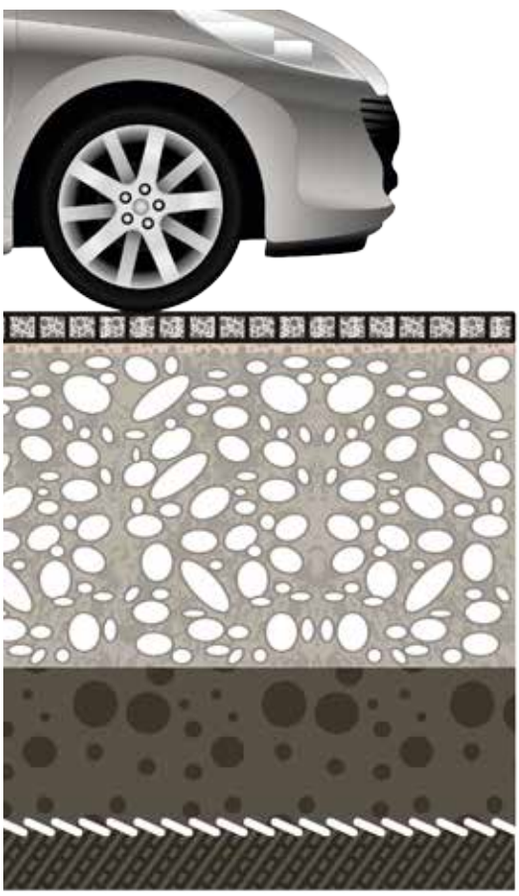
Pollutant barrier geotextile

floor/level — Level and plane with 1-1.5% slope

Example: Parking with ECORASTER® **STONE**

Filling: Hard-surfaced gravel

Heavy used areas, which shall be fully permeable and free of loose gravel can be installed with our "stone" system. In a special procedure two eco-friendly components are mixed together and get blended with the gravel filling. The results are sturdy and tough surfaces, with a high percolation rate (one liter per m^2 per second).



ECORASTER® — Filling;
Fill with gravel-glue-mix, screed redundant material.

Base layer

Levelling course, 1/4“ chip (or similar);
Approx. 4-5 cm levelled, then install ECORASTER® and plate tamp or roll to compact

Draining layer — Drainage layer 20 cm clear angular gravel (e.g. 0/32mm | 3/4“);
Fill with gravel and compact

Substructure — 10 to 45 cm gravel (e.g. 30/60 or 40/80mm | 1 1/2“) ;
For cars approx. 25 cm • Truck approx. 40 cm

Pollutant barrier geotextile

floor/level — Level and plane with 1-1.5% slope

Please note:

Considering the required technology and skills for this type of filling and the limited processing time, this system is best installed by professionals

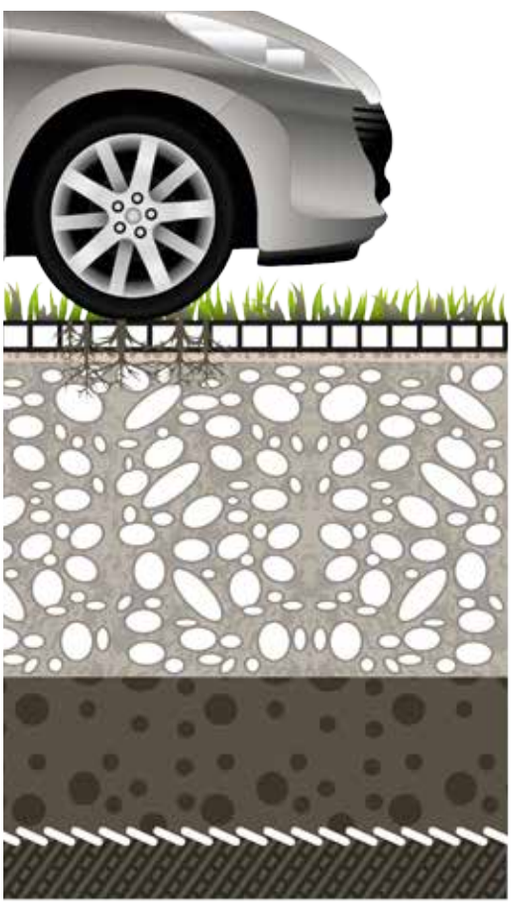
Please take advantage of our highly qualified customer service and consulting department to achieve the best possible results.

Important: This system is not loadable until full setting.

Example: Parking with ECORASTER® **MICROGREEN**

Filling: Substrate + seeds

After installing the ECORASTER® the area is filled with MICROGREEN, an compound of a highly durable substrate mixture and hardy herbage, sedum and moss plants. This type of filling is unique due to its high resilience and its low need for maintenance.



Advice!

To cut the ECORASTER® fast and straight we recommend using a hand-held circular saw. For smaller corners or areas which need to be cut more precisely please use a jigsaw. Do not cut the layers in advance. If possible please cut the layers after extending them beyond the edges of the area. Setting the ECORASTER® on a base for cutting can make it easier.

- **ECORASTER®** — Filling;
- **Base layer**
  - Fill with mineral substrate, sow seeds (mix of sand-thyme, mosses, sedum, mountain sweet grass, white clover)
  - **Levelling course, mineral substrate** (3/15mm, Microgreen-substrate); Approx. 4 cm levelled, then compact with roller to approx. 3 cm
- **Draining layer** — Drainage layer 20 cm clear angular gravel (e.g. 0/32mm | 3/4“); Fill with gravel and compact
- **Substructure** — 10 to 45 cm gravel (e.g. 30/60 or 40/80mm | 1 1/2“) ; For cars approx. 25 cm • Truck approx. 40 cm
- **Pollutant barrier geotextile**
- **floor/level** — Level and plane with 1-1.5% slope

Please note:

• This system is only suitable to a limited extent, when mainly used by heavy trucks.

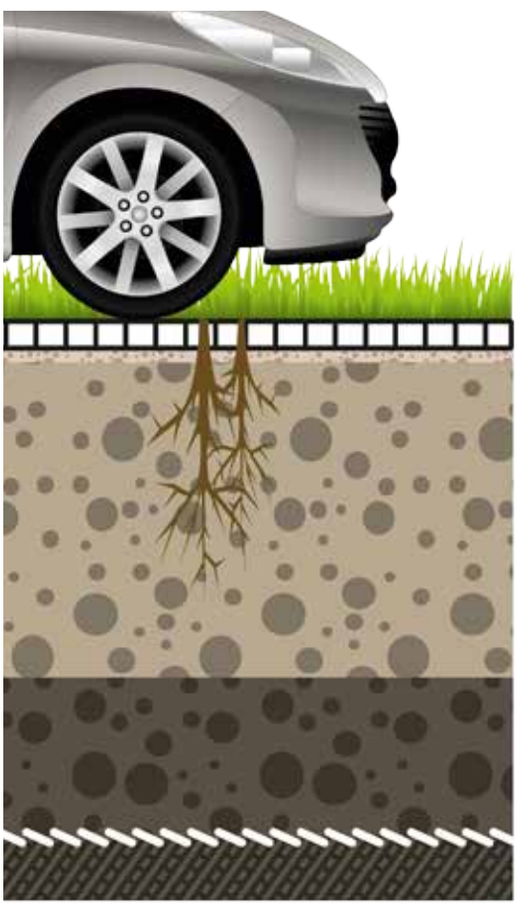
• Seeds need to be stored in a dry and dark place until sowing.

• Areas do not need mowing, fertilization or watering.

Example: Parking with ECORASTER® **GREEN**

Filling: Lawns, pre-greened or DIY greened

Installing the pre-greened ECORASTER® bleak and earthy soil turns into a grass field within a couple of hours. The immediate green result enables a swift acceptance of construction work. The surface is reinforced, drivable and permeable. Of course the ECORASTER® can be filled and greened as a DIY project.



We recommend the following seed mix::
20% Festuca Rubra Corn Rodeo
25% Festuca Rubra Trich Dawson
20% Festuca Arundinacea Mustang
15% Lolium Perenne Langa
20% Poa Pratensis Cynthia

ECORASTER® — Filling:
- pre-greened: Install ECORASTER® Green, use lawn roller to press on
- DIY greened: SEMILIT® (alt. mix 30% gravel + 70% humus + long-time fertilizer), elutriate seeding material.

Base layer
Levelling course: Fertilit®
(alt.: mix quartz sand, gravel, humus + long-time fertilizer);
Approx. 4 cm levelled, compact with roller to 3 cm.
Water compacted area before installing ECORASTER®.

Fertile layer — Intermediate: HYDROFERTIL® (mix with 65-70 % gravel 30/60 mm)
(alt.: mix 30-35 % Humus and 65 - 70 % gravel 30/60 mm)
Height approx. 20 - 30 cm

Drainning layer — Drainage layer; Gravel (e.g. 30/60 - 40/80 mm | 1 1/2")
Height approx. 10 - 40 cm, plate tamp or roll to compact

Pollutant barrier geotextile

floor/level — Level and plane with 1-1.5% slope

Please note:

- This system is of limited suitabilty for areas mainly used by heavy trucks.
- Green areas need maintenance (fertilization, watering and lawn care).
- In case of DIY greening please check if the location meets the demands of your seeding materials.
- Daily occupancy and the time of parking will affect the result of the greening.

Note:
Keep the soil level just below the top of the ECORASTER to protect the germinating seeds and ensure a durable parking/driving surface.

Example: Parking with ECORASTER® **Bloxx**

Filling: Paving stones

The new ECORASTER® Bloxx system allows quick ground reinforcement with modern paver design in a fully permeable manner. This system is perfect for parking, concrete replacement, accessible areas, driveways and paths. Look closely at the integrated drain: This innovative system prevents clogging. Grouting the joints? Not needed!

Feel free to combine Bloxx with the other ECORASTER® elements to include greened accents into your permeable area.

ECORASTER® Bloxx fits perfect into the safety interlocking system. As a result Bloxx can be combined with any other ECORASTER®.

ECORASTER® — Bloxx, filling with paving stones,
settle area with plate compactor (rubber mat).
140*140*45mm (each paver); Dark grey, light, red, white

Geo-fabric

Base layer

ECORASTER® mesh;
Construction textile with grid/net structure

Levelling course, 1/4" (chip or similar);
Approx. 4-5 cm levelled, then plate tamp or roll to compact

Draining layer — Drainage layer 20 cm clear angular gravel (e.g. 0/32mm | 3/4");
Fill with gravel and compact

Substructure — 10 to 45 cm gravel (e.g. 30/60 or 40/80mm | 1 1/2") ;
For cars approx. 25 cm • Truck approx. 40 cm

Pollutant barrier geotextile

floor/level — Level and plane with 1-1.5% slope

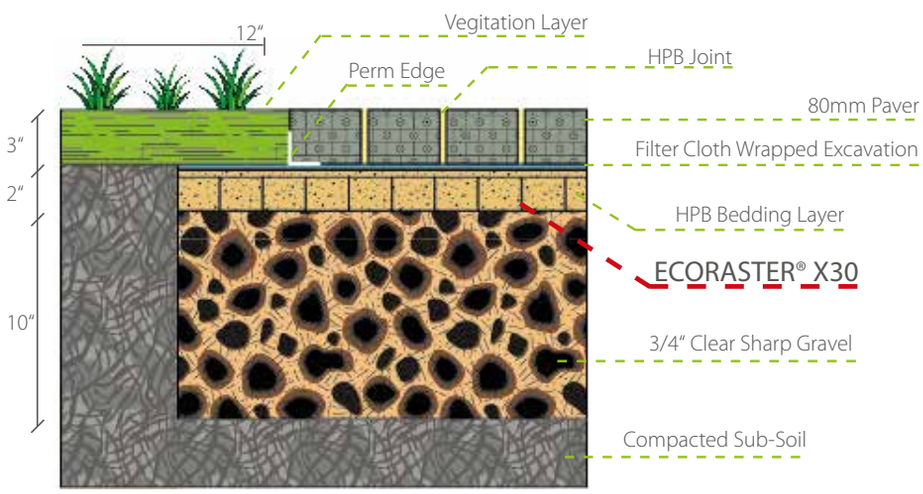
ECORASTER® X30 | Hardscape Base Stabilizer

Safe money and time on your substructure. The ECORASTER ® X30 is a heavy duty linking grid system that allows you to build stronger hardscapes by stabilizing the base material.

Your Benefits:

» Up to 50% base reduction in excavation
» Up to 30% labour cost savings
» Wider pin-point load dispersal
» Reduced warrantee call-backs from shifting and sinking
» Reduced risk of poor sub-base compaction
» Sustainable, efficient, and profitable!

Easy to install:



» Heavy Duty Base Stabilization
» Permeable Base Stabilization
» Interlock Driveway Base Support
» Permeable Interlock Concrete Paving Installation

Questions? Give us a call:
+1 800 495 55 17

Type:	Dimensions:	Material:	Wall thickness:	Load up to:	Solubility:	Compressive strength:	Weight per piece:	Weight per m^2 | 10.76 ft^2:
X30 Base Stabilizer	330 x 330 x 30 mm • 12.99 x 12.99 x 1.18"	100% recycled LDPE	0.2 in	23 t/ft^2 (unfilled) 75 t/ft^2 (filled)	resistant to acids, alkalis, alcohol, oil and petrol (de-icing salt, ammonia, acid rain, etc.)	up to 20t point axle load (DIN 1072)	0,77 kg • 1.7 lbs	6,93 kg • 15.3 lbs

Fire Access

So help won't stuck!

Fire-fighting operations are often hindered by the poor quality or lack of access lanes and parking and turning areas.
The reason for this is the development of organic material (humus). Mud filled tire treads and getting stuck in the mud can delay lifesaving access to the site in an emergency situation. Muddy, unstable and uneven ground will compromise the quick extinguishing of fire and other life saving measures.

The Requirements:

Access roads, parking and turning surfaces have to meet the minimum standards of the Road Building Class VI (Guidelines for standardizing vehicular trac surfaces- RStO)

Our Test Run Result:

Our pictures (bottom right) show a modern German fire truck, weighing16 tons fully equipped. Even though the truck has a fully adjustable 4WD and semi-offroad tires, it got stuck in normal grassland after driving only five meters. Heavy equipment was needed to get it back on track. The grass was unstructured and the area was under dry conditions..

The Solution:

The ECORASTER® system reinforces or "paves" the ground surface without sealing it. This means that even with high surface loads (up to 800 t / m^2 , depending on the filling type) the rainwater/ firefighting water can easily infiltrate into the ground, usually without additional complex drainage elements.

This also means that in some cases (depending on local legislation) there is no stormwater tax dependent on sealed surface area. The ECORASTER® system can be installed with different fill materials and it allows total design freedom for landscaping.

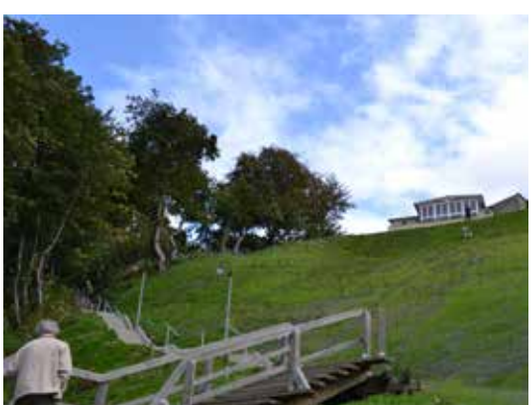
ECORASTER® E50 ensures safe access and parking/ turning of emergency vehicles.

Section from „Fire access surfaces" (TBB/ DIN 14090)		
Access	with:	• minimum 3 m (straight entrances) • minimum 3,5 m (entrances bordered with structures, where both side ≥ 12 m)
	tonnage:	total allowed weight minimum 16t minimum 10t per axle
Hard-standing	dimensions:	minimum 5 m x 11 m*
	tonnage:	minimum 800 kN per m^2
Turning area	dimensions:	• i.e. vehicle minimum 7 m x 12 m, • plus extensions (4 m) front and rear of turning areas
	tonnage:	minimum 16 t, minimum 10 t per axle

» Please note:
Please follow the instructions and guidelines on our website/ installation manual. The local code must be followed.

Questions? Give us a call:
+1 800 495 55 17

Installation on slopes: ECORASTER® A50



With over 200 expansion joints per square meter and 36 notched interlocking connectors per square meter the ECORASTER® counters the forces which are impacting the embankment. Erosion of the solum, soil destruction e.g. by rain water made channels, line-shaped erosion and nutrient washout can be prevented by a proper installation of the ECORASTER® system. Local engineering should can be consulted to address specific soil conditions.

The system's components (ECORASTER® A50 with groove for ground nails, universal hinge, ribbed ground nails) should be adapted to the requirements and the proper dimensions (e.g. ground nail size) and the interval between the nails (e.g. one per m^2) should be advised by the architect/ engineer.

To achieve the best result for this application following actions might to be taken before the ECORASTER® installation, depending on the initial conditions and soil conditions:

- Removal of loose rocks and non suitable soil material
- Clearing, removal of vegetation
- Fill up channels and draws
- Levelling/ profiling

Depending on the requirements, a sufficient measured substructure (as a base course/ levelling course) should be placed on the prepared slope. The installed ECORASTER® is filled to the top edge with suitable topsoil or a mixture of sand with soil, humus and e.g. substrate, which contains starting fertilizer for the greening. Substructure and filling material shall contain a small amount of fine material, to ensure a certain water reservoir capacity for the greening and to ensure water permeability.

Installation profile, ECORASTER® on slopes:

Please note:

- For a swift greening we recommend a standard mix of herbs or lawns with an application of minimum 20 g/m^2.
- Depending on the location vegetation types might vary. Please check the habitat requirements of your seeds. Preferable time for sowing is springtime.
- The bigger and better the area of ECORASTER® is covered/ vegetated the better the filling is protected against weather effects. Growing root penetration increases the interlocking with the substructure and effects the results of the ground/ embankment reinforcement.

Perfect fitting extensions | Softground

» Geotextiles/ Landscape fabric

Matching your project we are offering the required textiles.

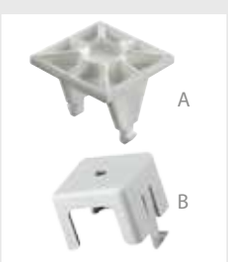
Installing the Bloxx we recommend to use ECORASTER® **mesh**.

» Hinge & Groundnails

Depending on the slope, the application and the tensile forces impacting the hillside/ embankment hinges and/or ECORASTER® A50 with ground nails are recommended. The ECORASTER® area will be interlocked with the slope and the tensile forces will be reduced effectively. The hinge can be adjusted 90° both ways.

» Curve-Element

The flexible connector for laying curves, radii and circles, e.g. for changes in direction when reinforcing soft road shoulders. Specially developed for the ECORASTER® system, it inserts seamlessly into the surface.



» Parking lot markers

The markers are inserted into the ECORASTER® and fixed in place with locking elements.

Two types of markers are available. For areas with snow-plowing service we recommend type B, as type A is raised.

360° View plus animation online:
Have a closer look : All ECORASTER® elements and accessories in 360° HD with animation on www.purus-plastics.de.

» SOFTGROUND®

The tough and non-slip rubber mat locks directly into the ECORASTER® E30 elements. Softground® is suitable for terraces, trade fairs, horseboxes and many other applications.

The substructure for SOFTGROUND® areas is similar to Mineral/ Stone.

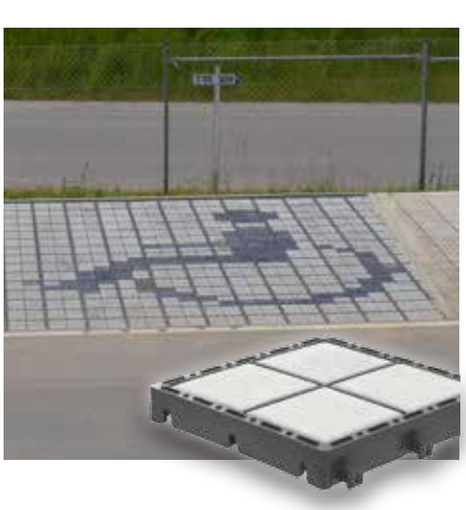
Accessible areas, accessibility

If you want to install accessible areas you can chose from different ECORASTER® types/ fillings.

Besides SOFTGROUND® you can also install ECORASTER® Stone or Bloxx.

Just give us a call...

We are eager to help you!



Review

For more than 20 years, Purus Plastics has manufactured ECORASTER® permeable ground reinforcement system, made of 100% recycled materials (LDPE). Our very first installation of ECORASTER E50 „Classic" was installed over 20 years ago at a busy waste collection depot. This specific installation is found in a cold climate and the grid has been subjected to the constant freeze-thaw cycle as well as constant snow plowing. Even with constant use by heavy trucks and repetitive loading and unloading, the area remains level, stable and in very good condition. The area has been allowed to naturally vegetate.

Our Promise of Quality

PURUS PLASTICS constantly monitors the quality of the self-generated raw materials and the in-house produced products, to guarantee what we promise: "Quality, made in Germany!"

As a technology leader we will not stop improving, in order to relieve future generations and to save valuable resources.

Manufacturing our ECORASTER® system for more than 20 years and its installation worldwide has proven that our system is durable, loadable and sustainable. As a founding member of the European quality network for "products made out of recycled materials" we want to ensure that best quality, best value and the highest environmental compatibility is ensured.

Frequently Asked Questions

Can I drive on ECORASTER®?

Yes you can! ECORASTER® is durable. Depending on the substructure and filling, the loadabilty can exceed 800 metric tons per m^2 (TÜV approved). Even right after installation, the empty elements (excl. Bloxx) are sturdy enough in empty conditions to drive on. This simplifies filling the area. See page 6 for more details.

Can I clear snow on ECORASTER® areas?

Yes you can! ECORASTER® withstands de-icing salt, brooms, snow plows, brush rollers. Please contact us for specific guidelines.

Is an ECORASTER® area considered ”permeable“?

More than 95% of the ECORASTER® surface is permeable/ open, so surface water cannot accumulate. Local authorities may declare "permeabillity" in order to save taxes or fees.

Can I install ECORASTER® w/o substructure?

Yes you can! In some circumstances there may be limitations to the performance of the ECORASTER® system. Thanks to the interlocking system and the excellent load distribution ECORASTER® can be installed without substructure. If you do not use a substructure (stormwater buffer) area drainage cannot be ensured. Additionally soil changes can effect surface irregularities and cause different loadabilities. If you plan to install without substructure, please contact us, we are eager to help you.

Are plastic reinforcement tiles less durable?

Not if you focus on quality! Our ECORASTER® come with a 20 year warranty and the best possible value. As both the raw material producer and the product manufacturer we can ensure a consistently high quality. Promise! Our system is made of 100% recycled LDPE (also recycable), heavy-duty, weatherproof and UV-resistant.

Do I have to install an edging?

No! The structure of the ECORASTER® tiles incorporates integral expansions joints which make an edging unnecessary. We suggest leaving a 5cm/2 inches space between the ECORASTER and the fixed border which also acts as an expansion joint

Is ECORASTER® eco-friendly?

PURUS PLASTICS operates one of the worlds most modern plastics recycling facility. Our products are eco-neutral and are engineered/ produced in Germany. We focus on a high input of recycled materials and the that our products remain recycable.

Basic information | Safety notes • Allgemeine Hinweise | Sicherheitshinweise

Dear customer,

Thank you for choosing the original ECORASTER®. You have chosen a premium class product that combines high performance and eco-friendliness. Our products are subject to our constant quality checks to match highest requirements. We want you to have the best possible and most enduring benefit from ECORASTER® and appreciate you noting the information below.

Thank you for your choice, PURUS PLATICS GmbH Germany.

Important information. Read carefully and keep for further reference.

• Please read the manual before handling ECORASTER®. For questions please contact your dealer/ sales representative.

• Please make sure that you always wear appropriate protective wear during handling (cutting, laying and filling) with ECORASTER® (safety goggles, gloves, ear and breathing protection, safety shoes and hardhat) and mind your environment and third parties. Do not breathe dust from cutting.

• ECORASTER® is inapplicable to bridge terrain indentations (e.g. holes, ditches and troughs).

• ECORASTER® is only extendable with original accessories.

• Do not combine ECORASTER® with third-party products.

• Make sure that substructure is level and sufficiently dimensioned.

• Make sure that all ECORASTER® are locked proper before filling.

• Please dispose no longer required ECORASTER® according to your local waste regulations.

WARNING

• Surface might be slippery when wet and icy

• Inappropriate handling (e.g. wrong transport or wrong storage) might cause (personal) damage.

• Broken or incorrect placed ECORASTER® might cause (personal) damage and influence the functionality. Beware of sharp edges.

• ECORASTER® is flammable. Don't breathe fumes of burning elements.

Sehr geehrte Kundin, sehr geehrter Kunde,

mit unserem original ECORASTER® haben Sie sich für ein erstklassiges Produkt entschieden, dass Umweltfreundlichkeit und hohe Leistungsfähigkeit kombiniert. Unsere Produkte unterliegen ständigen Qualitätskontrollen, um unseren Anforderungen zu entsprechen. Wir möchten, dass Sie lange Nutzen und Freude an Ihrem ECORASTER® haben und bitten Sie daher einige Hinweise zu beachten.

Vielen Dank für Ihre Wahl, PURUS PLASTICS GmbH Deutschland.

Wichtige Information. Sorgfältig lesen. Diese Information aufbewahren.

• Bitte lesen Sie vor der Verarbeitung der ECORASTER® die Anleitung. Für Fragen steht Ihnen Ihr Händler gern zur Verfügung.

• Bitte tragen Sie bei der Verarbeitung (dem Zuschneiden, der Verlegung sowie dem Verfüllen) angemessene Schutzbekleidung (Sicherheitsschuhe, Schutzbrille, Handschuhe, Mundschutz, Gehörschutz, Kopfschutz) und achten Sie auf Ihre Umwelt und Dritte. Abrieb, z.B. durch Zerspanen, bitte nicht einatmen.

• ECORASTER® eignet sich nicht zum Überbrücken von Geländevertiefungen (z.B. Gräben, Löcher, Mulden)

• ECORASTER® kann nur mit originalem Zubehör erweitert werden. • ECORASTER® ist nicht mit fremden Produkten kombinierbar.

• Der Unterbau muss vor dem Verlegen eben und ausreichend dimensioniert sein.

• Bitte prüfen Sie vor dem Verfüllen der ECORASTER® auf einwandfreie Verhakung der Elemente.

• Bitte entsorgen Sie nicht benötigte ECORASTER® gemäß den national geltenden Abfallbestimmungen.

ACHTUNG

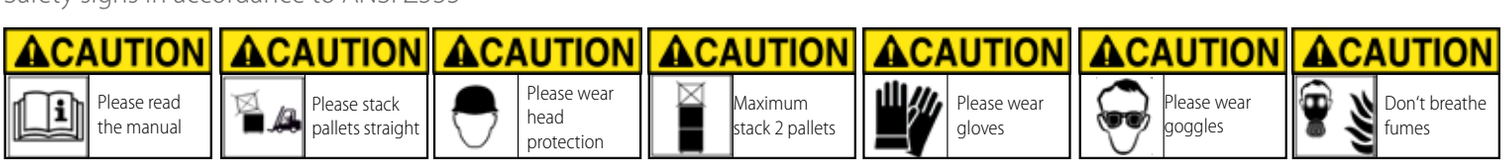
• Oberfläche kann durch Eis und Nässe glatt sein.

• Unsachgemäße Handhabung (z.B. falscher Transport oder fehlerhafte Lagerung) kann zu (Personen-) Schäden führen.

• Beschädigte oder unsachgemäß verlegte ECORASTER® können (Personen-) Schäden verursachen und die Funktion des Bodengitters beeinträchtigen. Achtung vor scharfen Kannten.

• ECORASTER® sind brennbar. Die Dämpfe brennender Kunststoffgitter nicht einatmen.

Safety signs in accordance to ANSI Z535



Developing sustainable solutions for a permeable ground reinforcement.

German engineering – available worldwide.
Questions? Please give us a call or contact your local dealer:

20 YEAR warranty
ECORASTER®

PURUS PLASTICS NORTH AMERICA

ECORASTER®

www.purus-northamerica.com

PURUS North America Inc. | 1790 Avenue Road Unit A | Toronto, ON | M5M 3Z1
Toll Free. +1-800-495-5517 | purus@purus-northamerica.com

Version PNA_IM_2015_rev1

ECORASTER®

Permeable Ground Reinforcement

Maintenance

ECORASTER® Bloxx | E Series

ECORASTER® E Series and Bloxx Maintenance Guidelines

Ecoraster® products are designed to be maintenance-free.

» For ECORASTER® gravel-filled applications, the surface should be inspected from time to time to identify signs of slight cell infill loss. The pavement should be monitored to ensure traffic frequency and loading does not exceed the pavement design.

» For ECORASTER® grass-filled applications, maintenance is limited to the grass element of the system. Irrigation, fertilizing, cutting etc. should be done according to the grass type and climate.

» For ECORASTER® Bloxx systems, no special maintenance or vacuuming is required. Leaves and other organic materials or garbage can be raked, swept or blown. Care should be taken not to remove the gravel, grass, or Bloxx inserts.

» ECORASTER® Bloxx inserts can be carefully removed and replaced if they are damaged or stained.

ECORASTER® E Series and Bloxx Snow Removal Guidelines

To ensure that the ECORASTER® products are not damaged, remove snow using one of the following methods:

» Use a plow blade with a flexible rubber edge or spacer pucks.

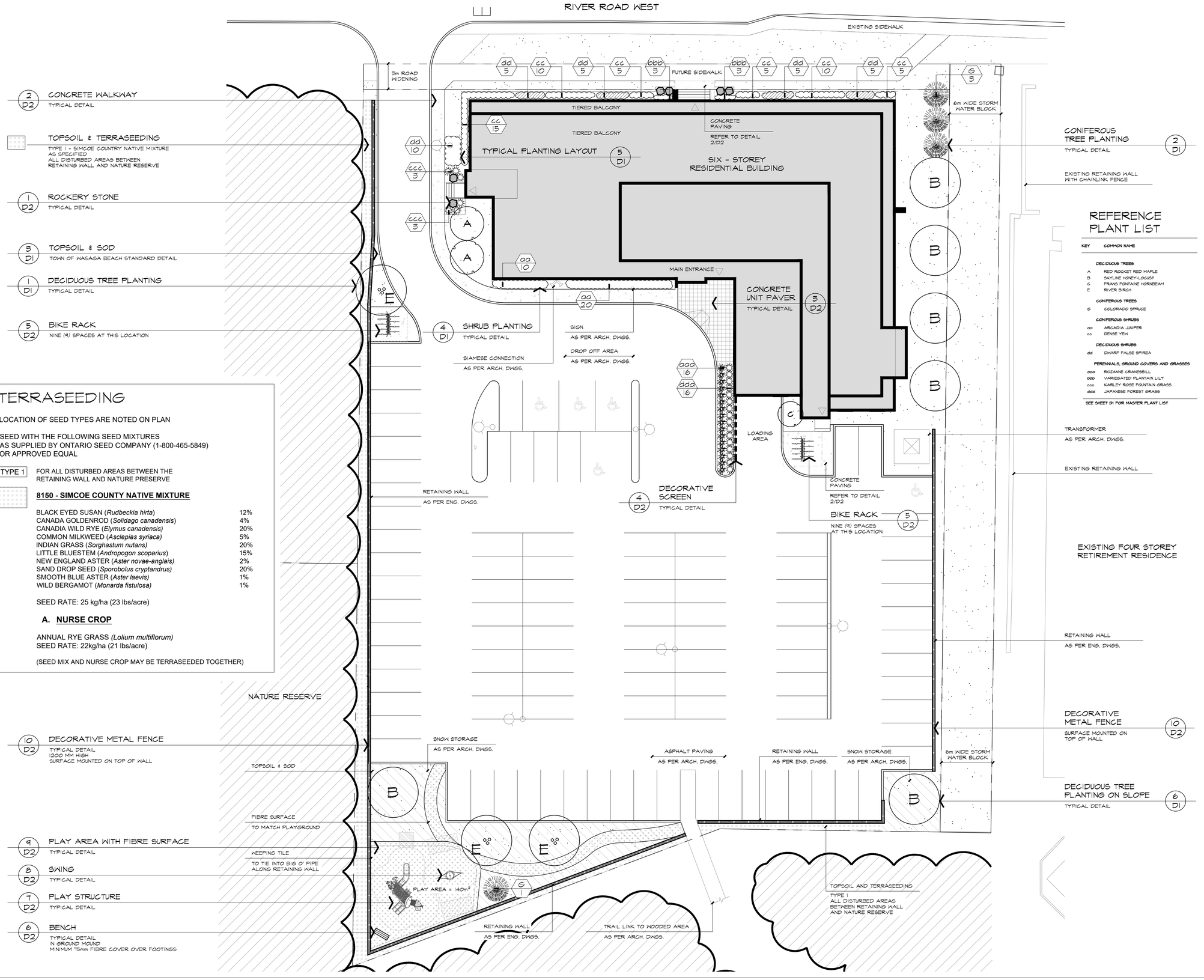
» Use a plow blade with skids on the lower outside corners so the plow blade does not come in contact with the ECORASTER® units.

Purus NA Ecoraster Inc.
801 Tremaine Ave. S. PO Box 53
Listowel, ON N4W 3H2

Toll Free: 1-800-495-5517
E-Mail: info@purus-northamerica.com
Website: www.purus-northamerica.com

Appendix D – Landscape Plan

CAPES Engineering Ltd.
355310 Blue Mountains-Euphrasia Townline
Clarksburg, ON
N0H 1J0



TERRASEEDING

LOCATION OF SEED TYPES ARE NOTED ON PLAN

SEED WITH THE FOLLOWING SEED MIXTURES
AS SUPPLIED BY ONTARIO SEED COMPANY (1-800-465-5849)
OR APPROVED EQUAL

TYPE 1 — FOR ALL DISTURBED AREAS BETWEEN THE RETAINING WALL AND NATURE PRESERVE

8150 - SIMCOE COUNTY NATIVE MIXTURE

BLACK EYED SUSAN (*Rudbeckia hirta*)	12%
CANADA GOLDENROD (*Solidago canadensis*)	4%
CANADIA WILD RYE (*Elymus canadensis)*	20%
COMMON MILKWEED (*Asclepias syriaca)*	5%
INDIAN GRASS (*Sorghastum nutans)*	20%
LITTLE BLUESTEM (*Andropogon scoparius*)	15%
NEW ENGLAND ASTER (*Aster novae-anglais)*	2%
SAND DROP SEED (*Sporobolus cryptandrus)*	20%
SMOOTH BLUE ASTER (*Aster laevis)*	1%
WILD BERGAMOT (*Monarda fistulosa)*	1%

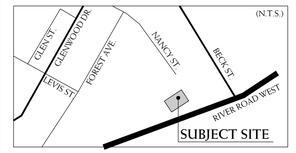
SEED RATE: 25 kg/ha (23 lbs/acre)

A. NURSE CROP

ANNUAL RYE GRASS *(Lolium multiflorum)*
SEED RATE: 22kg/ha (21 lbs/acre)

(SEED MIX AND NURSE CROP MAY BE TERRASEEDED TOGETHER)

KEY PLAN



LEGEND

EXISTING VEGETATION TO BE PRESERVED
DECIDUOUS TREES
CONIFEROUS TREES
SHRUB PLANTING
ROCKERY STONES
CONCRETE UNIT PAVER
DECORATIVE SCREEN
DECORATIVE FENCE
RETAINING WALL
BIKE RACK

REFERENCE PLANT LIST

KEY	COMMON NAME
DECIDUOUS TREES	
A	RED ROCKET RED MAPLE
B	SKYLINE HONEYLOCUST
C	FRANS FONTAINE HORNBEAM
E	RIVER BIRCH
CONIFEROUS TREES	
G	COLORADO SPRUCE
CONIFEROUS SHRUBS	
aa	ARCADIA JUNIPER
cc	DENSE YEW
DECIDUOUS SHRUBS	
dd	DWARF FALSE SPIREA
PERENNIALS, GROUND COVERS AND GRASSES	
aaa	ROZANNE CRANESBILL
bbb	VARIEGATED PLANTAIN LILY
ccc	KARLEY ROSE FOUNTAIN GRASS
ddd	JAPANESE FOREST GRASS

SEE SHEET D1 FOR MASTER PLANT LIST

BASE INFORMATION OBTAINED ELECTRONICALLY FROM AND ARCHITECTURE INC. (JOB NO. 18026; TEL. 905-604-6960)

no.	date	version	by
4	SEPT. 22 2022	ISSUED FOR THIRD SPA SUBMISSION	AV/ ED
3	DEC 7 2021	ISSUED FOR SECOND SPA SUBMISSION	SO /LB
2	AUG 21 2020	ISSUED FOR ZONING & SPA SUBMISSION	RS /AV
1	JUN 31 2020	ISSUED FOR CLIENT REVIEW	LK /RS

ONTARIO ASSOCIATION OF LANDSCAPE ARCHITECTS
MONICA E. CLARKE
OALA
MEMBER

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project

RIVERWOODS HOMES
RIVER ROAD WEST
WASAGA BEACH, ON

WASAGA RIVERWOODS HOMES INC.

drawing

LANDSCAPE PLANTING PLAN

date: JUNE 4 , 2020	drawn: RS
scale*: 1:200	file: 3383 L1 V6-220922
direction	project no.: 3383
	sheet no.: L-1

*NOTED SCALE IS APPLICABLE ONLY WHEN PRINTED ON ARCH D (24"x36") SIZE SHEET

SPECIFICATIONS

GENERAL

THESE SPECIFICATIONS ARE TO BE READ IN CONJUNCTION WITH THE GENERAL CONDITIONS OF THE CONTRACT AS PREPARED BY AND AVAILABLE AT THE OFFICE OF ALEXANDER BUDREVICS & ASSOCIATES LTD.

PRIOR TO COMMENCING WORK, THE CONTRACTOR SHALL:
1. FAMILIARIZE HIMSELF WITH THE PLANS, DETAILS, AND SPECIFICATIONS OF THIS PROJECT.
2. VISIT THE SITE TO ASCERTAIN AND TAKE ACCOUNT OF EXISTING CONDITIONS AND ANY DEVIATIONS FROM THE PLANS IN WORK BY OTHERS, AND
3. FINALIZE ALL DESIGN ALTERNATIVES IN CONSULTATION WITH THE LANDSCAPE ARCHITECT.

PRIOR TO EXCAVATING, THE CONTRACTOR SHALL VERIFY THE LOCATION OF ALL UNDERGROUND UTILITIES. IN THE EVENT OF A CONFLICT BETWEEN A PROPOSED TREE LOCATION AND AN UNDERGROUND SERVICE, THE EXACT LOCATION OF THE TREE SHALL BE DETERMINED ON SITE BY THE LANDSCAPE ARCHITECT.

THE CONTRACTOR SHALL, AT HIS OWN EXPENSE, REPAIR ANY DAMAGE TO EXISTING UTILITIES, STRUCTURES, FACILITIES, ETC. DONE IN THE PERFORMANCE OF HIS WORK.

ALL SITE WORK SHALL CONFORM TO THE CANADIAN NATIONAL MASTER CONSTRUCTION SPECIFICATIONS. A COPY OF WHICH CAN BE OBTAINED FROM CONSTRUCTION SPECIFICATIONS CANADA:
Tel: (416) 777-2198, Fax: (416) 777-219, Email: info@cscs-dcc.ca
IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO BE THOROUGHLY FAMILIAR WITH THESE SPECIFICATIONS AND THEIR IMPLICATIONS FOR THIS PROJECT.

SOFT LANDSCAPING

PLANT MATERIALS

ALL PLANTS SHALL BE INSTALLED TRUE TO SPECIFIED NAMES, SIZES, GRADES, ETC. AND SHALL CONFORM TO THE STANDARDS OF THE CANADIAN NURSERY TRADES ASSOCIATION.

ALL PLANTS SHALL BE NURSERY GROWN.

IN THE EVENT OF A DISCREPANCY IN PLANT QUANTITY BETWEEN THE PLANTING PLAN AND THE PLANT LIST, THE PLANTING PLAN SHALL GOVERN.

THE CONTRACTOR SHALL MAKE PLANTS AVAILABLE FOR INSPECTION BY THE LANDSCAPE ARCHITECT PRIOR TO INSTALLATION. MATERIAL NOT CONFORMING TO THE SPECIFICATIONS SHALL BE REPLACED AT THE EXPENSE OF THE CONTRACTOR.

PLANT SUBSTITUTIONS MUST BE APPROVED IN WRITING BY THE OWNER OR THE LANDSCAPE ARCHITECT PRIOR TO DELIVERY OF THE MATERIAL ON SITE.

THE LANDSCAPE ARCHITECT MAY, UPON COMPLETION OF THE WORK AND NOTWITHSTANDING PRIOR APPROVAL AT SOURCE, REJECT PLANT MATERIAL NOT CONFORMING TO THE SPECIFICATIONS.

THE CONTRACTOR SHALL USE STANDARD INDUSTRY METHODS FOR PLANTING TREES. TREES SHALL BE TURNED TO GIVE THE BEST APPEARANCE; THEY SHALL ALSO BE GUYED AND STAKED IMMEDIATELY AFTER PLANTING AND AS DETAILED ON THE DRAWINGS.

BED PREPARATION

THE CONTRACTOR SHALL BACKFILL TREE PITS AND PLANTING BEDS TO SPECIFIED DEPTHS WITH EITHER PRE-MIXED TOPSOIL (VIZ., "TRIPLE-MIX") OR A MIXTURE COMPRISED OF:
6 PARTS SANDY LOAM
1 PART FINELY PULVERIZED CANADIAN PEAT MOSS
1 PART WELL-ROTTED FARM MANURE, WITH "AGRIFORM" 20-10-5
TABLETS (OR APPROVED EQUAL) ADDED ACCORDING TO THE MANUFACTURER'S SPECIFICATIONS.

THE CONTRACTOR SHALL CONSTRUCT TREE PITS AND SHRUB BEDS WITH SOIL SAUCERS, MULCH, AND SUBSURFACE DRAINAGE AS DETAILED.

THE CONTRACTOR SHALL CONSTRUCT SHRUB BEDS IN CONTINUOUS FORMS, THE SHAPE OF WHICH SHALL BE APPROVED BY THE LANDSCAPE ARCHITECT AND/OR OWNER. ON SLOPES, SHRUB BEDS SHALL BE FASHIONED TO ALLOW FOR PROPER DRAINAGE.

TOPSOIL & FINE GRADING

THE CONTRACTOR SHALL PLACE 150mm OF RICH TOPSOIL ON APPROVED SUBGRADES. TOPSOIL SHALL BE IMPORTED WHERE REQUIRED. 10-6-4 FERTILIZER SHALL BE APPLIED ACCORDING TO THE MANUFACTURER'S INSTRUCTIONS AT A RATE OF 7.32 kg/100m² FOR SODDED AREAS; THE MIXTURE AND RATE OF APPLICATION SHALL BE ADJUSTED FOR SEEDED AREAS.

MINOR GRADE DEFICIENCIES AND IRREGULARITIES SHALL BE ELIMINATED PRIOR TO SODDING.

SODDING

THE CONTRACTOR SHALL SOD ALL AREAS SO INDICATED ON THE DRAWINGS. SOD SHALL BE FRESHLY CUT NO.1 GRADE NURSERY-GROWN TURF 50-75mm THICK.

SOD FOR SUNNY, EXPOSED AREAS SHALL BE 50% KENTUCKY BLUEGRASS AND 50% MERION BLUEGRASS. SOD FOR SHADED AREAS SHALL BE 50% NUGGET KENTUCKY BLUEGRASS AND 50% CREEPING RED FESCUE.

SOD SHALL BE PLACED ON PREPARED TOPSOIL, WITH JOINTS STAGGERED AND SECTIONS ABUTTED TIGHTLY. IMMEDIATELY AFTER LAYING, IRRIGATION SUFFICIENT TO ENSURE MOISTURE PENETRATION TO A DEPTH OF 100mm SHALL BE APPLIED.

SOD SHALL BE MACHINE ROLLED TO ENSURE UNIFORM CONTACT WITH TOPSOIL.
SOD ON ALL SLOPES SHALL BE PEGGED WHERE REQUIRED.

TERRASEEDING

THE CONTRACTOR SHALL FINE GRADE AND FERTILIZE AS RECOMMENDED BY SOIL TEST ANALYSIS REPORT. MINOR GRADE DEFICIENCIES AND IRREGULARITIES SHALL BE ELIMINATED PRIOR TO SEEDING.

THE CONTRACTOR SHALL TERRASEED ALL AREAS WITH SPECIFIED SEED MIXTURES AS NOTED ON DRAWINGS.

DEPENDING ON SLOPE GRADATION, DEPTH OF COMPOSTED SOIL, SEED SHALL BE AS FOLLOWS:

0-5% SLOPE: 10-15 mm. DEPTH
5-10% SLOPE: 15-20 mm. DEPTH
10-25% SLOPE: (4:1) 20-25 mm. DEPTH
25-35% SLOPE: (3:1) 25-40 mm. DEPTH
35-45% SLOPE: 40-50 mm. DEPTH

THE CONTRACTOR SHALL FERTILIZE AS RECOMMENDED BY SEED SUPPLIER.

WATER AS REQUIRED TO OBTAIN THICK GROWTH. FOLLOW UP OVERSEEDING IS PART OF THIS WORK.

HARD LANDSCAPING

POURED-IN-PLACE CONCRETE WORK

THE CONTRACTOR SHALL OBTAIN WRITTEN APPROVAL OF FORMWORK PRIOR TO POURING CONCRETE. ALL CONCRETE, STEEL REINFORCING, AND FORMWORK SHALL BE AS DETAILED AND SPECIFIED ON THE DRAWINGS.

THE STYLE, COLOUR, AND FINISH OF CONCRETE ELEMENTS SHALL BE APPROVED BY THE OWNER AND/OR LANDSCAPE ARCHITECT PRIOR TO THE COMMENCEMENT OF CONCRETE WORK.

ALL STRUCTURAL CONCRETE WORK SHALL CONFORM TO LOCAL BUILDING CODES AND REGULATIONS.

BRICKWORK, STONEWORK & CONCRETE UNIT PAVING

WHERE APPLICABLE, THE CONTRACTOR SHALL OBTAIN WRITTEN APPROVAL FROM THE LANDSCAPE ARCHITECT OF ALL STRUCTURAL CONCRETE WORK BEFORE COMMENCING BRICKWORK, STONEWORK OR PAVING WORK.

ALL BRICKWORK, STONEWORK, AND CONCRETE UNIT PAVING SHALL BE AS DETAILED AND SPECIFIED ON THE DRAWINGS, UNLESS THE LANDSCAPE ARCHITECT AND/OR THE OWNER APPROVE SUBSTITUTIONS IN WRITING.

PRIOR TO STARTING THIS PORTION OF WORK, THE CONTRACTOR SHALL SUBMIT SAMPLES OF ALL PROPOSED BRICKWORK, STONEWORK, AND CONCRETE UNIT PAVERS FOR APPROVAL BY THE LANDSCAPE ARCHITECT AND/OR THE OWNER WITH RESPECT TO STYLE, COLOUR, AND FINISH. THE CONTRACTOR MAY ALSO BE ASKED TO SUBMIT SAMPLES OF ALTERNATIVES TO THE MATERIALS SPECIFIED ON THE DRAWINGS.

ALL BRICKWORK, STONEWORK, AND CONCRETE UNIT PAVING SHALL CONFORM TO LOCAL BUILDING CODES AND OTHER MUNICIPAL REQUIREMENTS.

WOODWORK

ALL WOOD SHALL BE NO. 1 GRADE DRESSED CLEAR CEDAR, PRESSURE-TREATED RED PINE, OR PRESSURE-TREATED JACK PINE, AS SPECIFIED ON THE DRAWINGS.

PRESSURE TREATMENT SHALL BE FACTORY-APPLIED COPPER CHROME ARSENATE OR EQUAL, AS PER CSA-080 SPECIFICATIONS.

CLEAR CEDAR OR SPECIALTY WOODS SHALL BE STAINED WITH TWO (2) COATS OF STAIN, PAINT OR PRESERVATIVE.

THE CONTRACTOR SHALL SUBMIT SAMPLES OF ALL PROPOSED FINISHES FOR APPROVAL BY THE LANDSCAPE ARCHITECT AND/OR THE OWNER PRIOR TO ITS APPLICATION. THE CONTRACTOR MAY ALSO BE ASKED TO SUBMIT SAMPLES OF ALTERNATIVES TO THE MATERIALS OR FINISHES SPECIFIED ON THE DRAWINGS.

METALWORK

PRIOR TO ORDERING MATERIAL FOR THIS PORTION OF WORK, THE CONTRACTOR SHALL SUBMIT SAMPLES OF ALL PROPOSED METALWORK FOR THE APPROVAL OF THE LANDSCAPE ARCHITECT AND/OR THE OWNER WITH RESPECT TO STYLE, COLOUR, AND FINISH. THE CONTRACTOR MAY ALSO BE ASKED TO SUBMIT SAMPLES OF ALTERNATIVES TO THE MATERIALS SPECIFIED ON THE DRAWINGS.

LENGTHS FOR FENCING SHALL BE MEASURED IN THE FIELD BY THE CONTRACTOR; SCALED MEASUREMENTS FROM THE DRAWINGS SHALL NOT BE RELIED UPON FOR DETERMINING THE NUMBER OF SECTIONS OF FENCE OR THE SIZE OF GATES THAT WILL BE NEEDED.

MAINTENANCE

THE CONTRACTOR SHALL MAINTAIN ALL LANDSCAPED AREAS FOR A PERIOD OF FOUR (4) GROWING MONTHS FROM THE DATE OF SUBSTANTIAL COMPLETION.

MAINTENANCE SHALL INCLUDE:
- PROPER IRRIGATION TO ENSURE OPTIMUM GROWTH OF TREES, SHRUBS, AND SOD
- GRASS MOWING TO MAINTAIN AN APPROXIMATE HEIGHT OF 50mm
- THE CULTIVATION AND WEEDING OF TREE PITS AND PLANTING BEDS
- INSECT AND DISEASE CONTROL

AT THE END OF THE SPECIFIED MAINTENANCE PERIOD, PROVIDED ALL PLANT MATERIAL IS ALIVE AND IN A HEALTHY GROWING CONDITION, THE OWNER WILL ASSUME THE RESPONSIBILITY OF MAINTAINING THE LANDSCAPE WORK.

PERFORMANCE ACCEPTANCE (SUBSTANTIAL COMPLETION)

WRITTEN NOTICE OF PERFORMANCE ACCEPTANCE BY THE LANDSCAPE ARCHITECT FOR SUBSTANTIAL COMPLETION OF THE PROJECT LANDSCAPE WORKS SHALL MARK THE START OF THE GUARANTEE PERIOD.

SHOULD LOCAL LAW REQUIRE MUNICIPAL ACCEPTANCE, THE LANDSCAPE ARCHITECT WILL SUBMIT THE SUBSTANTIAL COMPLETION CERTIFICATE TO THE MUNICIPALITY SO THAT THEY MAY PROCEED TO INSPECT THE WORK, ISSUE THEIR PERFORMANCE ACCEPTANCE CERTIFICATE, AND REDUCE THE AMOUNT OF SECURITIES.

GUARANTEE

ALL PLANT MATERIAL SHALL BE GUARANTEED FOR TWO (2) YEARS FROM THE DATE ON THE PERFORMANCE ACCEPTANCE CERTIFICATE ISSUED BY THE LANDSCAPE ARCHITECT. PLANTS THAT EXPIRE OR OTHERWISE FAIL TO THRIVE DURING THE GUARANTEE PERIOD SHALL BE REPLACED AT THE EXPENSE OF THE CONTRACTOR.

SIMILARLY, ALL OTHER LANDSCAPE WORK PERFORMED UNDER THIS CONTRACT SHALL BE FULLY GUARANTEED FOR ONE (1) YEAR FROM THE DATE OF PERFORMANCE. ACCEPTANCE BY THE LANDSCAPE ARCHITECT.

FINAL ACCEPTANCE

ALL WORK SHALL BE INSPECTED AT THE END OF THE GUARANTEE PERIOD BY THE LANDSCAPE ARCHITECT. ANY DEFICIENCIES SHALL BE RECTIFIED BY THE CONTRACTOR TO THE SATISFACTION OF THE LANDSCAPE ARCHITECT AND THE OWNER. THE LANDSCAPE ARCHITECT WILL THEN ISSUE A FINAL ACCEPTANCE CERTIFICATE.

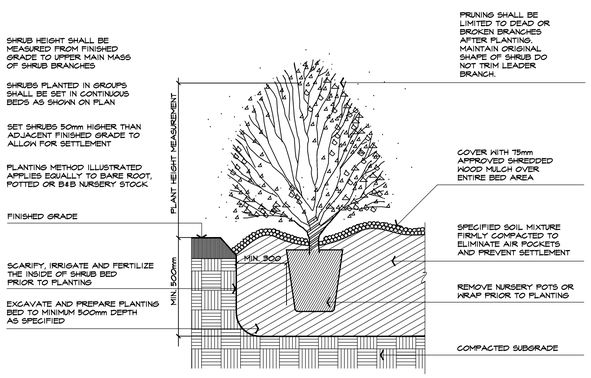
SHOULD LOCAL LAW REQUIRE MUNICIPAL ACCEPTANCE, THE LANDSCAPE ARCHITECT WILL SUBMIT THE FINAL ACCEPTANCE CERTIFICATE TO THE MUNICIPALITY SO THAT THEY MAY PROCEED TO INSPECT THE WORK, GIVE FINAL APPROVAL, AND RELEASE ALL OUTSTANDING LANDSCAPE SECURITIES.

MASTER PLANT LIST

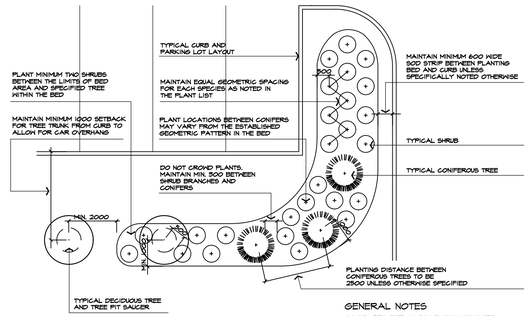
PROJECT NAME:
RIVERWOODS HOMES-(ABAL 3383)

In the event of a discrepancy between the planting plan and the plant list quantities, the planting plan shall govern.

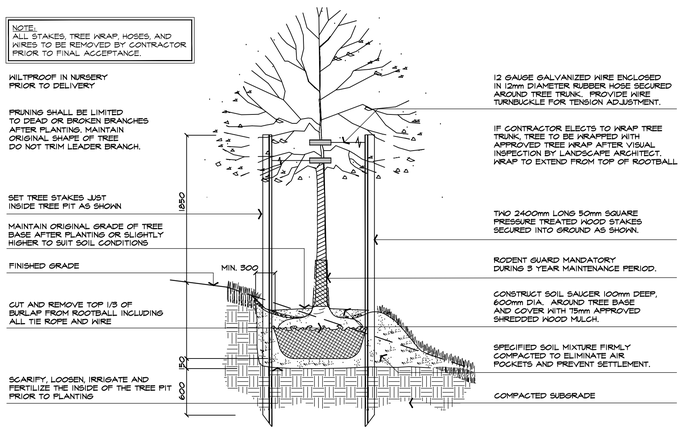
KEY	QUANTITY	BOTANICAL NAME	COMMON NAME	CALIPER	HEIGHT	SPREAD	ROOT	REMARKS	SPACING
		DECIDUOUS TREES							
A	2	ACER RUBRUM 'RED ROCKET'	RED ROCKET RED MAPLE	60mm	3500mm	1500mm	B.B.	EQUAL FORM	- - - -
B	6	GLEDITSIA TRIACANTHOS 'SKYLINE'	SKYLINE HONEY-LOCUST	60mm	3500mm	1500mm	B.B.	EQUAL FORM	- - - -
C	1	CARPINUS BETULUS 'FRANS FONTAINE'	FRANS FONTAINE HORNBEAM	50mm	3500mm	1500mm	B.B.	EQUAL FORM	- - - -
E	3	BETULA NIGRA	RIVER BIRCH	50mm	3500mm	1500mm	B.B.	MULTI STEM	- - - -
		CONIFEROUS TREES							
G	4	PICEA PUNGENS	COLORADO SPRUCE	- - - -	2000mm	1000mm	B.B.	SPECIMEN	- - - -
		CONIFEROUS SHRUBS							
aa	30	JUNIPERUS SABINA 'ARCADIA'	ARCADIA JUNIPER	- - - -	- - - -	600mm	POTTED	MIN. 15 CANDLES	800mm
cc	50	TAXUS MEDIA 'DENSIFORMIS'	DENSE YEW	- - - -	- - - -	600mm	POTTED	MIN. 15 CANDLES	800mm
		DECIDUOUS SHRUBS							
dd	30	SORBARIA SORBIFOLIA 'SEM'	DWARF FALSE SPIREA	- - - -	600mm	- - - -	POTTED	MIN. 10 STEMS	650mm
		PERENNIALS, GROUND COVERS AND GRASSES							
aaa	16	GERANUM x 'ROZANNE'	ROZANNE CRANESBILL	- - - -	- - - -	- - - -	1 gal. POT	MIN. 2 YRS. 6TH.	400mm
bbb	6	HOSTA FORTUNEI 'ALBOMARGINATA'	VARIEGATED PLANTAIN LILY	- - - -	- - - -	- - - -	1 gal. POT	MIN. 2 YRS. 6TH.	400mm
ccc	6	PENNISETUM ORIENTALE 'KARLEY ROSE'	KARLEY ROSE FOUNTAIN GRASS	- - - -	- - - -	- - - -	1 gal. POT	MIN. 2 YRS. 6TH.	800mm
ddd	16	HAKONECHLOA MACRA	JAPANESE FOREST GRASS	- - - -	- - - -	- - - -	1 gal. POT	MIN. 2 YRS. 6TH.	400mm



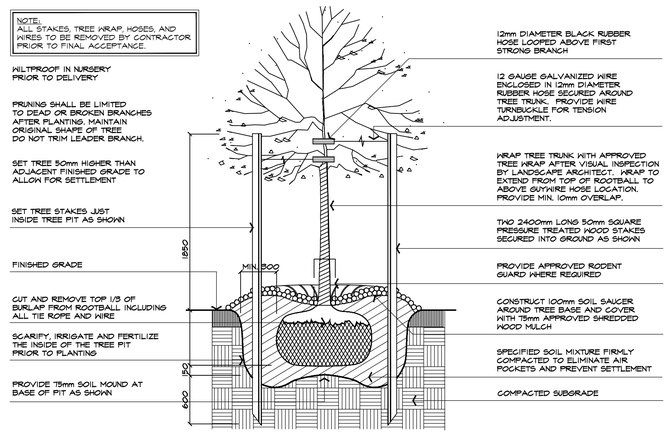
4 SHRUB PLANTING DETAIL — NTS
TYPICAL INSTALLATION — ABAL P301-040305



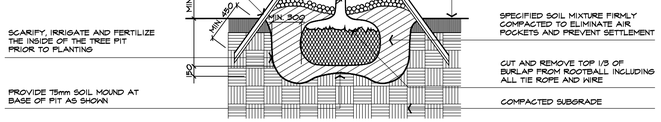
5 TYPICAL PLANTING LAYOUT — NTS
SYMBOLS REPRESENT INSTALLED PLANT SIZE — ABAL P401-140328



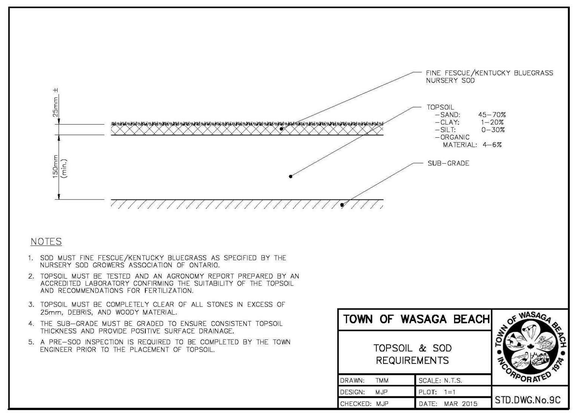
6 DECIDUOUS TREE PLANTING ON SLOPE DETAIL — NTS
ABAL P303-051027



1 DECIDUOUS TREE PLANTING DETAIL — NTS
TYPICAL INSTALLATION FOR 75mm CALIPER TREES OR LESS — ABAL P101-051027



2 CONIFEROUS TREE PLANTING DETAIL — NTS
TYPICAL INSTALLATION FOR 2000mm HEIGHT TREES OR LESS — ABAL P201-051027



3 TOPSOIL AND SOD DETAIL — NTS
TOWN OF WASAGA BEACH STANDARD DETAIL

no.	date	version	by
4	SEPT. 22 2022	ISSUED FOR THIRD SPA SUBMISSION	AV/ ED
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project
RIVERWOODS HOMES
RIVER ROAD WEST
WASAGA BEACH, ON
WASAGA RIVERWOODS HOMES INC.

drawing
LANDSCAPE DETAILS

date JUNE 4 , 2020	drawn RS
scale* AS SHOWN	file 3383 D1 V6-220922
direction	project no. 3383
	sheet no. D-1

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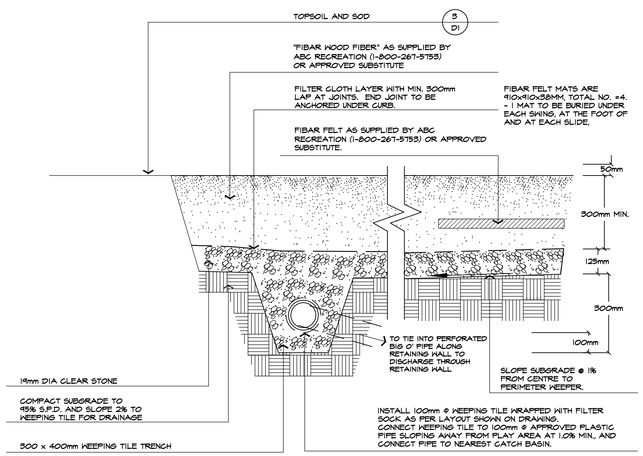
8 SWING

NTS

MANUFACTURER: JAMBETTE

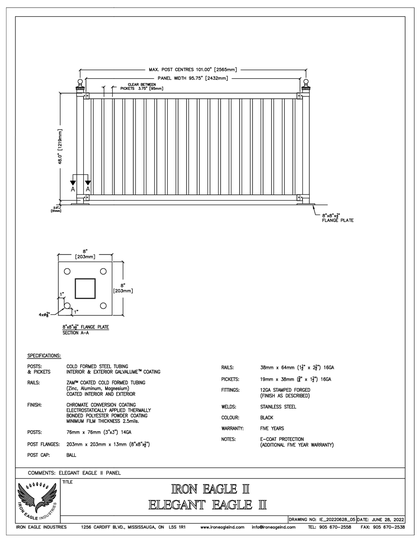
PRODUCT: ETNA TRAPP-1 - GX-07069
COLOUR: TO BE APPROVED BY CLIENT & LANDSCAPE ARCHITECT PRIOR TO ORDERING



9 PLAY AREA WITH FIBRE SURFACE DETAIL

NTS

ABAL G105x-220617



10 DECORATIVE METAL FENCE

NTS

MANUFACTURER: IRON EAGLE

PRODUCT: ELEGANT EAGLE II
COLOUR: TO MATCH BUILDING FEATURES OR BLACK POWDERCOAT
HEIGHT: 1200 MM

400 SERIES

MBR-0400-00015
Legacy # MBR400-9-S

Sustainability Facts

Unit Size	One (1) 400 Bike Rack
	MIN. MAX.
Carbon footprint (GWP)	129 238 Kg CO2-Eq
Measured in kilograms of carbon dioxide equivalent	
Total energy use (TPE)	2260 4390 MJ-Eq
Measured in megajoules of energy equivalent	
Water use (WDP)	1.06 3 m3 water
Measured in cubic metres of water	
Material recyclability	100%
LEED v4.1 Credits	
Type III Environmental Product Declaration	✓
Material Inventory	✓✓
Low VOC finishes	✓✓
Free of Red List substances	✓

*Full EPD can be referenced for more information: https://www.epdinformation.com/maglin/

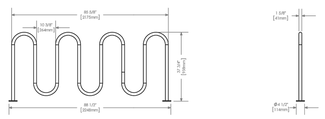
DESCRIPTION: 400 Series - 400 Bike Rack: H.S. Steel Tube, Surface Mount, 9 Bike Configuration

FINISH: All steel components are protected with E-Coat rust proofing.
The Maglin Powdercoat System provides a durable finish on all metal surfaces.

INSTALLATION: The bike racks are delivered pre-assembled. It is available with a surface mount installation.

TO SPECIFY: Select MBE-0400-00015
Choose:
- Powdercoat Color

HEIGHT: 37.75" (95.8cm) LENGTH: 85.63" (217.5cm) DEPTH: 1.63" (4.1cm) WEIGHT: 45.86 lbs (20.8kg)



MAGLIN Site Furniture
T 800 718 5558
F 877 290 5558
www.maglin.com
sales@maglin.com

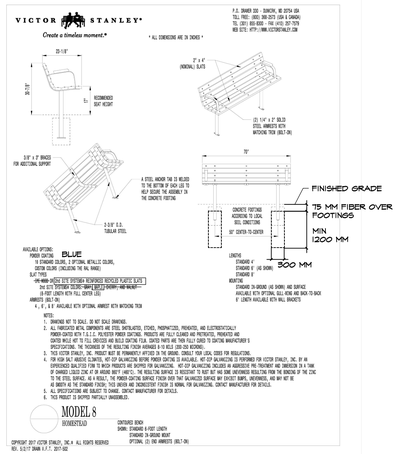
5 BIKE RACK

NTS

MANUFACTURER: MAGLIN

PRODUCT: MBR-0400-00015 400 SERIES
COLOUR: GUNMETAL FINE TEXTURE
QUANTITY: TWO (2)

OR APPROVED SUBSTITUTE



6 BENCH - DIRECT BURIAL

NTS

MANUFACTURER: VICTOR STANLEY
PRODUCT: MODEL 8 CONTOURED BENCH
MATERIAL: REINFORCED RECYCLED PLASTIC SLATS
COLOUR: TO MATCH PLAY STRUCTURE - TO BE APPROVED BY CLIENT & LANDSCAPE ARCHITECT PRIOR TO ORDERING

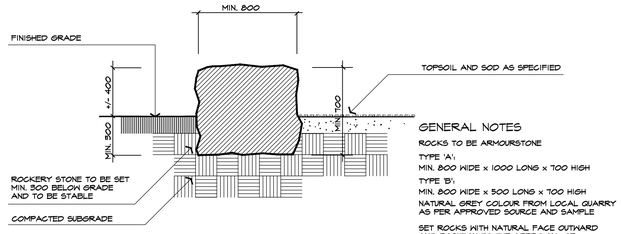
OR APPROVED SUBSTITUTE

7 PLAY STRUCTURE

NTS

MANUFACTURER: JAMBETTE

PRODUCT: PLAYSTRUCTURE - JS-22310-SHA
COLOUR: TO BE APPROVED BY CLIENT & LANDSCAPE ARCHITECT PRIOR TO ORDERING



GENERAL NOTES

ROCKS TO BE ARMOURSTONE

TYPE 'A':
MIN. 800 WIDE x 1000 LONG x 700 HIGH

TYPE 'B':
MIN. 800 WIDE x 500 LONG x 700 HIGH

NATURAL GREY COLOUR FROM LOCAL QUARRY AS PER APPROVED SOURCE AND SAMPLE

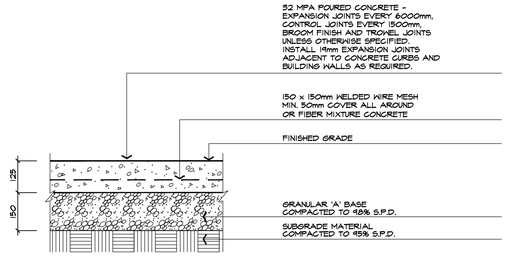
SET ROCKS WITH NATURAL FACE OUTWARD AND POSITION TO THE APPROVAL OF LANDSCAPE ARCHITECT

1 ROCKERY STONE DETAIL

NTS

SINGLE TIER AT GRADE

ABAL R201X-180502

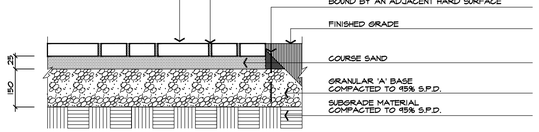


2 CONCRETE WALKWAY DETAIL

NTS

TYPICAL INSTALLATION

ABAL H201-000529



3 CONCRETE UNIT PAVER DETAIL

NTS

TYPICAL INSTALLATION

ABAL H301-070613

4 WOOD SCREEN DETAIL

NTS

TO FUTURE DETAIL

no.	date	version	by
4	SEPT. 22 2022	ISSUED FOR THIRD SPA SUBMISSION	AV/ ED
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OALA
MEMBER

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project

RIVERWOODS HOMES
RIVER ROAD WEST
WASAGA BEACH, ON

WASAGA RIVERWOODS HOMES INC.

drawing

LANDSCAPE DETAILS

date JUNE 4 , 2020	drawn RS
scale* AS SHOWN	file 3383 D2 V6-220922
direction	project no. 3383
	sheet no. D-2

*NOTED SCALE IS APPLICABLE ONLY WHEN PRINTED ON ARCH D (24"x36") SIZE SHEET