



Project Narrative

Archbishop O'Sullivan Catholic School

Presented By:



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Introduction

Our goal at Niagara College was to design a natural play space that challenges students to think, to explore, and to learn outdoors. We created a platform that encourages all types of play and fosters a beginning and ongoing interest in nature. It was important to consider design elements that meet the expectations of the students as well as fit the site conditions. Our master plan aims to solve the major issues such as poor draining, compacted soil and to improve overall functionality by using a variety of natural materials, while rethinking how each zone flows into the other. We have produced a cohesive design that will stimulate young minds through outdoor exploration.



Key Problem Areas

In almost every area of the playground, standing water is an issue. This leads to turf damage, soil compaction and decreased plant health. Proper drainage and water control can be achieved through the use of berms, swales and depression nodes.

Soil compaction and poor water drainage are issues in the wooded area of the playground. This is a result of a high volume of foot traffic and high moisture content. These problems can be addressed through the extensive use of mulch and improved drainage through soil aeration. Soil aeration in the wooded area is recommended prior to mulch application to begin the process of alleviating compaction and improving drainage. Aeration will increase the effectiveness of top mulching in reducing compaction and increasing drainage over time.

The degradation of the turf on the sports field and rink area is not only a major aesthetic issue, but also causes a large percentage of the playground to have very limited usability for a large portion of the school year. The source of this problem is twofold.

- I. The rink area is considered a single season use zone; changes need to be made to make the area functional even when the ice is gone.
- II. The amount of gravel and asphalt that is being introduced onto the turf through snow removal from the adjacent paved play during winter.

1. Drainage

Drainage is one of the key issues faced on the school property. We will be combating this by rejuvenating and adding to the existing swale drainage system. This will help water from the sports field area flow more efficiently into a redefined and expanded swale system in the Gr. 4-8 area. The increased flow will travel into the Gr 1-3 playground which will also have additional swales added to the system to decrease the amount of standing water in all three areas of the playground. These adjustments will help increase surface water absorption into the ground water more effectively by increasing the surface area of the swales through linear distance. Also, developing control depressions, will give the excessive volume of water a chance to effectively move through the swales while the ground is typically saturated with moisture. Ultimately, the swales flow excessive water that can't be absorbed into the ground water off site to the city storm-water drainage system to deter flooding of the playgrounds.

This improved drainage will be achieved through the use of defining the drainage route that works with the natural flow of water on the site. There is an existing culvert

underneath the pathway dividing the Gr. 1-3 area from the Gr. 4-8 area, which we feel is inadequate to move the amount of water under the pathway. We propose adding another culvert next to the Gr 4-8 asphalt area closer to the four square area, as well as depression nodes along the additional swale systems. These modifications will provide relief to the swale during periods of excess flooding during a heavy rain event or during cold season freeze/thaw cycles. The depression nodes will slow water by allowing for pooling, as well as time for the pooled water to reabsorb into the soil. During low water seasons, the nodes will be dry and not pools of standing water. Gravel fill as well as planting material in the nodes will create them to be rich wildlife habitats. Suggested planting materials in the nodes include native plants that are either wetland shrubs or thrive in wet soil. These include red-osier dogwood, button-bush, cattails, and small cultivar willows shrubs.

Solving the issue of drainage will allow for students to use the grounds even after periods of precipitation, will aid in solving drainage issues, and will relieve safety issues associated with overly wet school grounds, and encourage natural play through topography and an opportunity to explore new wildlife habitats. Below are some highlighted features that will be included in the swale system, listed by zone:



Sports Area:

- Swale system including depression nodes with native plantings such as cattails, red-osier dogwood, button-bush, and shrub-type willows
- The first of two swales that facilitates natural water flow to the south-east corner of the property
- Drainage of pooling water and flooding in the fields, to begin the proposed swale system

Grade 4-8 Area:

- New culvert beside the asphalt
- Wooden bridges along the swale for crossing during wet periods
- Swale aids in water movement, flowing along the top of the field near the asphalt, and at the back of the field, along the existing swale system, both swales going through the G1-3 area to the municipal drainage system



Grade 1-3 Area:

- Drainage water enters the area from both culverts (one old, one new), under the walkway that separates the G1-3 from grades the G4-8 areas
- Swale with pooling depression nodes, containing native bog plants
- First node facilitates a 90 degree turn changing the water flow from along the top of the field, to the bottom of the field
- A second pooling depression controls the flow and serves as a catchment for melting snow in spring, opening into existing swale that leads water to the southeast municipal drain outside the perimeter the school

Junior /Senior Kindergarten Area:

- Relieve outer area flooding
- Natural slope to the ground, leading to the southeast municipal drain
- Interactive swale along berm, slows and utilizes water

2. Soil Compaction

The pooling of water, combined with high foot traffic, has caused the soil in the wooded area to become compacted. The lack of oxygen in the soil, and poor water drainage will continue to stunt root growth and decrease vitality in existing vegetation. The Archbishop O'Sullivan schoolyard is unique in that it has many mature canopy trees within the school grounds. The trees in the wooded area are a valuable natural asset to the school, and we kept their health in mind during our design process. The trees provide many benefits including shelter for the students (e.g., shade in the warmer seasons and a windbreak in the cooler seasons), a habitat for native bird and insect species, and green space to benefit the mental health of faculty, students, and the community. It is very important to maintain the health of trees on the site to be able to continue enjoying all of the natural services they provide. We have four key recommendations to begin the process of alleviating compaction issues to ensure long-term tree health:

- Core aeration: Removing small soil cores to a depth of about 3 inches will increase pore spaces for air and water exchange needed for tree roots and continued tree health. This method is effective in increasing surface permeability, but does not address compaction in deeper soil layers.
- Vertical mulching: Holes 1 – 2 inches in diameter may be drilled in the compacted soil and filled with compost and mulch, or other amendment material.
- Radial trenching: Trenches 6 – 8 inches wide, no deeper than the root system or depth of compaction, can be dug with trenching equipment. Trenches are dug, extending from the trunk of an existing tree in a radial pattern, and backfilled with a mixture of soil and amendments.

- Top mulching: As the final step to follow, adding mulch will aid in relieving further compaction with continued foot traffic, and add organic matter back into the soil over time.

We recommend core aeration and vertical mulching before the first application of top mulching. As mulch will have to be reapplied in the future, more invasive treatments such as the radial trenching could be done as a future initiative. Top mulching is depicted on the master plan in a distinct and inviting pattern that promotes both traffic flow and exploration. This mulch layer properly distributes the weight of foot traffic, preventing compaction. The mulch will provide benefits such as a natural forest floor appeal to enhance the forest theme, aiding in moisture retention for tree roots, having a cooling effect, and defining forest 'rooms' by using two different colours of mulch. The two colours of mulch will have the added benefit of creating a pattern that will excite students and add to their fun while playing in the space.

3.Degradation of Rink and Sports Field Areas

The sports field area is used by grades 4-8, as well as the community. Drainage and single-use functionality are two of the main issues. The space is comprised mainly of hardscape and turf, with the existing turf receding and flooding. We would like to improve the functionality of the hockey area by changing it into a multi-use zone, which will also improve the vitality of turf in the soccer field area. A berm will separate the two fields, containing the gravel from the ice rink zone, while protecting the turf of the sports field. This is one of the largest spaces of the school yard defined by both square footage and the number of students who use it. The ice rink is also used by the surrounding community, which makes improving and maintaining this space a key maintenance point to allow for enjoyment many years to come.

As emphasized, improving drainage on the property as a whole is a priority, and the proposed swale system begins in this area of the site. Relief of flooding in this area in particular will reduce turf degradation significantly, and allow for the survival of existing turf. Caring for the existing turf is the preferable option, with total or partial turf replacement being a much more expensive secondary option.

Design features

In a world with an ever-increasing amount of screen time it is important to design a playground that stimulates as many senses as possible. In addition to designing for sight, sound, smell and touch it is important to remember to add features that will aid and increase the body's sense of balance and the body's sense of itself through compound or multi-joint movements.

Sports Field and Main Asphalt Area:



Teaching, Pollinators Garden and Sustainable Water Management Demonstration Area

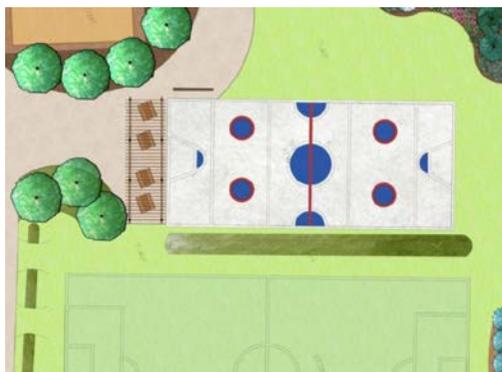
The roofed teaching garden is to be located at the corner adjacent to the soccer field, and will become a valuable space for both curriculum and community usage. The roofed teaching garden provides shelter, pollinator friendly garden beds, eating benches, and features a rain barrel as water reservoir that can double as a teaching aid and water supply. Students can learn about the water cycle and participate in taking care of the planting beds. We would also like to include a few bird and bee houses to further increase habitat.



Changes on the Asphalt

We believe the existing spider play structure near the parking lot goes largely unused. This area will function better as a sandy volleyball area which was requested by the students, and can also serve as track and field and play during regular recess time. In addition, moving the bike racks to the side of the school, to increase safety for bikers and will increase the functionality of an under-utilized space. We propose to

keep one full basketball court, transitioning the second underused to a half-court which is better suited for smaller groups of students, and moving the four-square area to prevent cross game interference. We added a gaga ball court, as upon our visit students were trying to create a gaga ball court by using human bodies for walls. The gaga ball court can be easily removed during the winter to allow for snow plows. These changes will allow for the rest of the design to flow, and improve how the students use the asphalt zone of the schoolyard.



Multi-Use, All-Season Hockey Zone

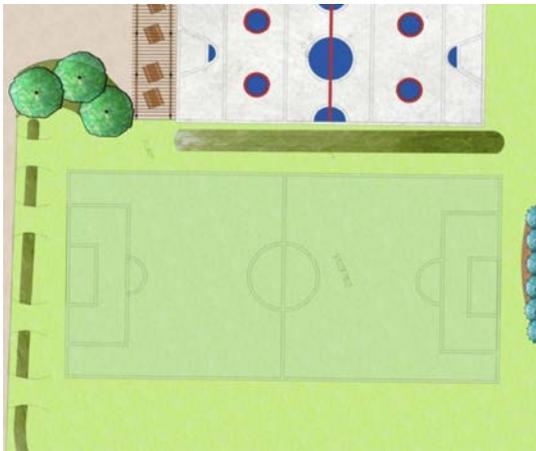
The area of the playground where the ice rink is installed during the colder months is beloved by students and the community. During the majority of the year in warm season weather, it is a gravel area that goes largely unused by the students who prefer the adjacent soccer field, and asphalt area. Our

goal is to turn this into a multi-sport area, with all season usage, and improved facilities for skating use in the winter season. Updating this area to a hard surface with permanent boards, will allow for four season use and increase the quality of ice surface. This will be prioritized as a later phase of development, though should be considered as one of the most important areas to improve for continued community and student use of the space.



Divider and Seating Berm

The berm in between the multiuse sports pad and the soccer field serves multiple purposes: containing the gravel, maintaining the turf in the soccer field, informal seating and play. The installation of the berm aims to improve the functionality of both spaces, separating the two areas, and aiding in the maintenance and protection of the improved soccer field, preventing the as is ice rink gravel area from “spilling” beyond the hockey area into the soccer field. The berm can also be used for winter play during snowy months.



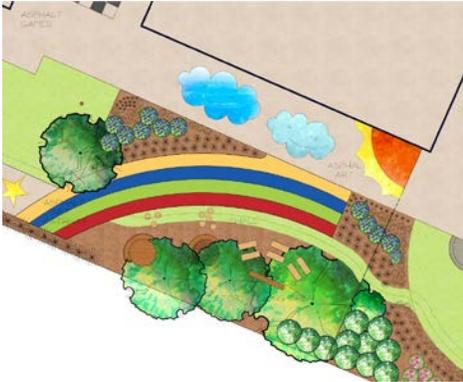
A 'Real' Soccer Field

As the only functional large turf area on the school grounds, we would like to maintain the turf on the soccer field, and repaint it to create a dedicated soccer space. Soccer is one of the biggest pastimes of the 4-8 students, and many students expressed a wish to have a ‘real’ soccer field, complete with nets and painted lines. The swale will also improve the functionality of the soccer field by alleviating flooding during freeze-thaw cycles and heavy rain events. The reduction in standing water will aid in maintaining the turf, and increase playable time.



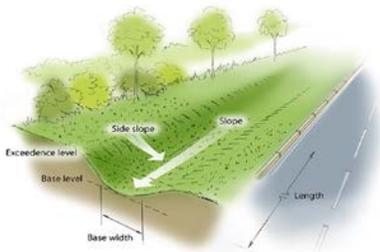
Junior / Senior Kindergarten Play Area

Area Expansion and Outdoor Classroom

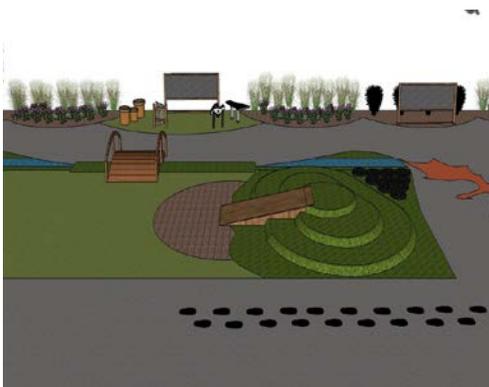


To create a more inviting space, we propose removing the fence between JK/SK and gr. 1-3 playgrounds; and extend the JK/SK playground to the end of the building line. This expansion allows us to utilize the existing vegetation, with incorporation of natural materials such as logs and tables, to make it a shaded outdoor classroom that can double as a resting area during recess. To ensure the classroom privacy from the rest of the site, we propose adding plantings, including shrubs and ornamental grasses, in between.

Rainwater Management and Interactive Swale



Considering the area has a gentle slope that leads to the southeast end of the site, to encourage surface water absorption, we propose to slow and utilize rainwater by installing a berm slide and an interactive swale next to it. The slide will be made of natural material, and reclaimed tires filled with soil will be used as steps to climb up. The interactive swale will be created by regarding the turf to lead the excess water away from the playing area, for no pooling is created. This allows children to interact safely with one of the most important elements of nature water.



Privacy Buffer and Creativity Zone

To address the concern of traffic noise and lack of privacy, we propose to add a buffer zone along the fence line consisting of selected plantings and creative wall features. Plants were selected to attract wildlife and to engage the five senses. For example, ornamental grasses provide a visual screen and engage sound when the traffic passes by. Plantings are designed to

surround the creativity zone which includes drawing boards and music walls with cost-effective, recycled material, and we propose it to be installed in a community setting.

Playground Markings and Murals



Time in Kindergarten is fundamental during cognitive development, thus, providing a stimulating, creative space is integral to developing diverse and versatile physical and cognitive strength. Considering the limited budget, we propose to paint colourful markings and murals on the ground that can encourage movement, engage visuals as well as stimulate imagination. One example of the classic markings is four-squares.

Free Space and Free Play

Looking back to our childhood when well-designed play structures weren't available, we still had fun with ordinary objects like rocks. We came up with rules in actively communicating with our peers, and we truly immersed ourselves in nature as we were



provided the tools to explore. Therefore, in addition to existing play structures, we propose to add moveable features to encourage unstructured, free play to further stimulate imagination and resourcefulness. Examples of elements to encourage movable features include a playhouse, loose toys and a storage shed.

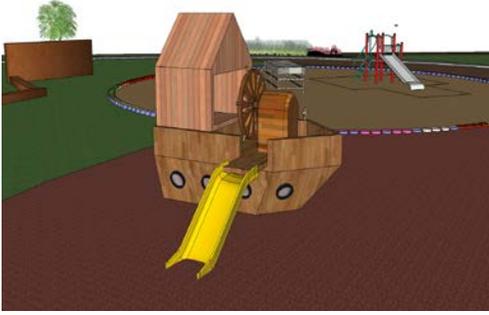
Grade 1-3 Natural Play Area



Stage and Seating Area

The Stage and Seating area is made of flat boulders placed on a bed of play sand, with a natural outdoor musical xylophone in the center as a focal point.

This area is frame by cut logs accurately spaced for games like leap frog. Encompassing the whole is a 6" layer of deep brown mulch protecting the existing mature trees and defining the space by colour.



Pirate Ship:

A pirate ship shaped natural play station in a sea of light brown mulch provides the opportunity for imagination with features like a rope ladder, climbing walls, a slide, and ramps were designed to be inclusive. Benches adorned with herb planters are placed nearby for student to watch the imaginary adventure of Captain Jack Sparrow.



Balancing Logs:

Balancing logs area includes updating the existing large sand box with a framed made of logs at varying heights in an octagon shape to support math curriculum. Adjacent on the existing slope a new climbing feature of recycled tires is added, which ensures that there are ample opportunities for climbing and sitting, as well as encouraging the principles of reduce, reuse, and recycle.



Labyrinth:

A labyrinth of simple design and materials interrupts a limestone screenings path that connects the main asphalt area to the existing raised trail lining the back fence. The labyrinth is made of landscape pavers and turf which is conveniently located away from existing mature tree roots to prevent damage during installation. The labyrinth encourage inner quietness and mental balance. This design achieves a holistic nature experience and can aid in defusing confrontation between students on the playground.



Tactile Variation:

Tactile variation is provided by transitioning between logs to mulch, stone screenings, turf and sand. Multiple colors of mulch are used in combination with large sweeping arches to promote flow and exploration between

playground features. This use of varying ground covers to provide both visual and tactile variety in this area can be considered an outstanding design element and stimulates all five senses.

Grade 4-8 Natural Play Area



Interconnected Wood Slice Pathway:

A central junction point made from limestone screenings diverges into creative curvilinear pathways spread over the newly mulched existing mature treed area. The pathways are made up of colourful wooden slices and encourage open ended creative play. Each pathway leads to an existing or new destination: berm, playground, asphalt pathway, raised trail, sports field area, wood play track, musical corner and a new outdoor classroom with wooden log tables in varying height with seating.



Adventure Berm with Year-Round Interest

The berm is to be installed on the existing slope adjacent to the asphalt sports area which has been redesigned to alleviate conflict between basketball and playability on the berm. The berm is designed on top of the existing slope to increase a slope steep enough to encourage sliding. The berm will have two slides to encourage exercise as children run up and down the berm, and sliding downhill on a toboggan! The berm will also aid in preventing the movement of excess gravel from the broken asphalt into the natural tree area by snow plows.

Creative Wooden Play Track

Active play is encouraged by the use of wood posts, logs, and wood boards. Two large wooden logs have a climbing structure which then lead to a pathway of wooden boards. This pathway ends up at a great destination, the bird houses wall, a series of bird house hanging from the trees.



Music Corner

A music corner is situated near the front swale. This musical system is made with bamboo sticks of varying sizes and colours, textures and sound. This feature will stimulate the students' creativity and teaches new rhythms, sounds, beats and music styles. This design feature offers a creative way to play, engaging the sense of sound.

Budget and Phasing

In Phase One we recommend focusing on solving the major problems that involve the whole site, such as soil compaction and drainage issues. By repeating certain features like the outdoor classrooms, setting up resting areas, and add plantings to less wooded areas, Phase One planning improves overall functionality as well as adds exciting new components that provide a platform for people to explore nature.

Phase Two focuses on area quality improvement such as resurfacing and adding advanced structures.

ITEM #/ DESCRIPTION	TOTAL
Phase One	
Swale and Berms	\$18,000.00
Mulch	\$3,500.00
Outdoor Classrooms	\$2,000.00
Lumber	\$1,800.00
Plantings I	\$4,000.00
Playhouse	\$250.00
Art Boards	\$500.00
SUM	\$30,050.00
Phase Two	
Base Materials (Sod. Screenings)	\$3,000.00
Plantings II	\$4,000.00
Hockey Field	\$15,000.00
Soccer	\$1,800.00
Roofed Structure/Rain Barrels	\$6,000.00
Pirate Ship	\$1,000.00
Slides	\$2,200.00
SUM	\$30,000.00

Planting

Studies report that natural environments can provide psychological restoration that are imperative to people’s physical, psychological, and social resources. (Amicone., et al. 2018). We want to develop and encourage interest in the natural world, while improving the aesthetics.. We want to restore nature on site so it can perform its restorative effect, which may lead to better performance when recess is over and class time resumes.

There are multiple areas within the schoolyard that we believe will benefit from additional planting and could survive without getting trampled by students. We suggest the use of hardy and urban tolerant native plants wherever possible. It is import to install a design that will last through the years, enhance the aesthetic appeal of the grounds, and provide food and habitat to native wildlife species. We have prepared a list of proposed species and cultivars for use in various zones in the schoolyard:

Large canopy trees:	
<i>Acer rubrum</i>	red maple
<i>Liriodendron tulipifera</i>	tulip tree
<i>Quercus muehlenbergii</i>	chinquapin oak
Evergreen trees:	
<i>Juniperus virginiana</i>	eastern red cedar
<i>Thuja occidentalis</i>	eastern white cedar
Specimen trees:	
<i>Cercis canadensis</i>	redbud
<i>Hamamelis virginiana</i>	witch hazel
Shrubs:	
<i>Amelanchier canadensis</i>	serviceberry
<i>Buddleia davidii</i> 'Royal Red'	Butterfly bush
<i>Cephalanthus occidentalis</i>	button-bush
<i>Cornus</i> spp.	dogwood

<i>Hydrangea paniculata</i> 'Little Lamb'	Little Lamb hydrangea
<i>Salix</i> spp.	shrub-type willow
<i>Viburnum lentago</i>	nannyberry viburnum
Perennials and grasses:	
<i>Asclepias</i> spp.	milkweed
<i>Calamagrostis</i> 'Karl Forester'	feather reed grass
<i>Echinacea purpurea</i>	purple coneflower
<i>Geranium maculatum</i>	wild geranium
<i>Hylotelephium</i> 'Autumn Joy'	Autumn Joy sedum
<i>Miscanthus sinensis</i> 'Goliath'	Goliath maiden grass
<i>Panicum virgatum</i> 'Prairie Fire'	Prairie Switch grass
<i>Pennisetum alop.</i> 'Little Bunny'	Fountain grass
<i>Rudbeckia hirta</i>	black-eyed Susan
<i>Solidago</i> spp.	goldenrod

Come Alive Outside Competition Conclusion

The Come Alive Outside competition challenged us to create a design that encouraged the students to get outside, get active, and engage their senses. We aimed to pick design elements that considered all five senses:

Sight: colours, textures and new forms from plantings, new lines on the soccer field, creative use of coloured mulches and hardscape materials to create patterns.

Sound: Grasses and other plant materials rustling in the wind, babbling moving water in the swale system, sounds from new wildlife creating and living in their new habitats.

Smell: natural smells from natural materials like mulch and plants will help encourage memories from experiences of past natural environments.

Touch: Play is encouraged throughout the space with multiple existing and added play structures, and new natural materials added. Hands-on playing in the interactive swale as well as with the rain barrel collection system will add a new experience.

Taste: Herbs and edible plants are introduced in the front entrance community garden and the bench planter in the grade 1-3 area.

We appreciate the opportunity to attend, participate, and design. We hope our submission offers the solutions and improvements the school grounds need, and we hope the students enjoy our ideas!

REFERENCES

Amicone, G., Petruccelli, I., Dominicis, S. D., Gherardini, A., Costantino, V., Perucchini, P., & Bonaiuto, M. (2018). Green Breaks: The Restorative Effect of the School Environment's Green Areas on Children's Cognitive Performance. *Frontiers in Psychology*, 9. doi: 10.3389/fpsyg.2018.01579

<http://www.jornalagora.info/deco-jardin-avec-tige-de-bambou-ac47.asp>

LINKS TO RESOURCES

<https://www.geveko-markings.com>

<https://flintobox.com/blog/child-development/21-outdoor-games-kids>