Playspace & Site
Furnishings
Infrastructure
Maintenance

Playspace and Wheeled Sport Facility Design and Construction Standards

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INTENT OF USE

This guideline was developed for establishing standards for the *City of Edmonton* expectations in the design and construction of their infrastructure assets. Care has been taken to confirm the accuracy of the information contained herein. The views expressed herein do not necessarily represent those of any individual contributor. As the design of the assets and systems described herein continually evolves, and practices change and improve over time, so it is necessary to regularly consult relevant technical standards, codes, and other publications rather than relying on this publication exclusively. The *City of Edmonton*, authors, and members of the review committee, want to convey that this document does not constitute a project specific design. As such, no part of this document alleviates the responsibility of the professionals retained to design and/or construct specific projects from taking full responsibility and authenticating their designs in accordance with APEGA, AALA, AAA, Alberta Building Code, and any other statutory or safety requirements.

***Professional Work Product (PWP)* Responsibility Matrix**		
***Authenticator* (Seal)**	**Section(s)**	***Validator* (Permit)**
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VER	Date	Revision Summary
03	2022-08-11	Minor updates, revisions and addition of 2022 Poured-in-Place Rubber Surfacing specification (Appendix F).
02	2022-01-10	Added Authentication and Intent of Use
01	2020-03-02	Original Issue
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MEMORANDUM

POURED-IN-PLACE RUBBER: RE-EVALUATION OF ITS VIABILITY AS AN APPROVED PLAYGROUND PROTECTIVE SURFACING

The purpose of this memo is to notify all current Contractors, Suppliers, Installers and Stakeholders of poured-in-place rubber that a re-evaluation of the product was started in 2015. This will include:

- CAN/CSA-Z614 compliance testing of existing poured-in-place rubber,
- A cost comparison analysis to other accessible protective surfaces,
- Supplier and/or Installer warranties,
- Conditions to new pre-qualified Suppliers and/or Installers,
- Upon completion, the outcome of this re-evaluation will be reflected in an updated and revised poured-in-place rubber standard.

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PART A.
SCOPE OF STANDARD

1. PREFACE

1.1. The City of Edmonton (COE) has developed this standard to address the planning, design and construction of children's playgrounds. This standard shall apply to all new playgrounds and those undergoing redevelopment or renovation.

1.2. The owner/operator supports a 'designed' approach to the development of play and natural learning spaces under its jurisdiction.

1.3. Establish a comprehensive 'program' from which to establish the design. As part of this process, input is to be sought from children, students, caregivers and associated staff.

1.4. Utilize a 'universal design' approach in the preparation of a site master plan which in turn complies with all applicable codes and regulations, and provides for a diverse range of settings and play opportunities.

1.5. Units of measure are converted from imperial measurements and are exact metric conversions. To parallel the CSA Z614 Standard, all measurements shall have a +-2% variance allowance.

2. INTENT OF THE CITY OF EDMONTON STANDARD

2.1. The intent of this standard is to state the COE's interpretation of the Canadian Standards Association CAN/CSA Z614 Children's Playgrounds and Equipment and to outline supplemental standards. The standard identifies requirements intended to meet design objectives in a manner that promotes positive play experiences in a safe environment.

2.2. CAN/CSA Z614 Children's Playgrounds and Equipment (CSA) has been adopted as a minimum standard. The COE has clarified, modified and enhanced *CSA* standards in several specific areas to; reflect past experience, accident report information and additional maintenance considerations.

2.3. In the event that the *CSA* technical committee on Children's Playgrounds and Equipment releases an updated version of CAN/CSA Z614, the updated version shall take precedence and replace the existing standard on the date of release. Playground designs that have not received final approval shall be evaluated and modified to comply with the new standard.

2.4. Exceptions to the standard may be reviewed upon submission of documentation in support of the requested change by the proponent. This information should provide examples of the proposed exception that can be either field inspected or reviewed through literature. The proponent is responsible to provide the documentation.

3. DEFINITIONS

3.1. *Annex H* – is a supplemental document approved for the CSA Z614 titled "Children's Play and Equipment that are Accessible to Persons with Disabilities". The document spells out a minimum requirement for Playground accessibility. It is written in mandatory language for where it is required as a policy.

3.2. *CSA* – is the abbreviation for Canadian Standards Association, a non-profit governing body of independent, autonomous organizations that work towards the further development and improvement of voluntary standardization in the national interest. CAN/CSA Z614 Children's Playspaces and Equipment is the standard developed by the Technical Committee on Children's Playgrounds and Equipment. In all cases, refer to the most recent version of the document.

3.3. *Professional Judgment* – refers to the ability of an individual with current knowledge, skill, or experience, or a combination of these characteristics, in the field of Playgrounds/Playground equipment design, use, or operations, which enables the person to form an opinion or make a decision, or both, concerning a matter within that area of expertise. (current CAN/CSA Z614 'definitions').

3.4. *Review Committee* – consists of the Project Manager, Landscape Architect, and the Playground Supervisor for the project.

3.5. *Measurement* - Where both metric and imperial measurements are provided in a standard, the metric *measurement* shall be used.

3.6. *COE* - is the abbreviation for *City of Edmonton.*

PART B. SUPPLEMENT TO CAN/CSA – Z614: APPLICATION OF CITY OF EDMONTON STANDARD

4. EQUIPMENT

4.1. BRIDGES

4.1.1. Bottom rung of metal rail and chain bridges shall not be installed higher than 304 mm above the surface.

4.2. CHAIN

4.2.1. Chain extending into concrete piles shall be a minimum of grade 40 steel and no less than 6 mm (1⁄4 inch) diameter. If the chain extends into poured-in-place it requires a sleeve and pivot mechanism.

4.2.2. To eliminate lacerations caused from peeling plastic and to allow inspection to determine the degree of wear, all metal chains shall be free from plastic or rubber coating.

4.3. CLIMBING WALLS

4.3.1. Grasping and standing points must be secured with at least two fasteners to prevent rotation.

4.3.2. Stand-alone climbing walls shall not exceed 2743 mm in height. Stand-alone climbing walls with last climbable surface 1829 mm and higher shall have a minimum 3000 mm fall zone. Stand-alone climbing walls with the last climbable surface lower than 1829 mm in height shall have a minimum 1829 mm fall zone.

4.3.3. Climbing walls shall only be linked or functionally linked with one another or with composite structure platforms. All other play elements surrounding a climbing wall within the composite structure shall require a minimum fall zone of 1829 mm.

4.3.4. Climbing walls that are functionally linked with one another shall be positioned no closer than 254 mm and no farther than 305 mm apart. Climbing walls positioned at distances greater than 305 mm from one another are not considered functionally linked and shall comply with standards specified in clause 4.3.2 above for stand-alone climbing walls.

4.3.5. Climbing walls that are functionally linked with composite structure platforms shall be positioned no closer than 254 mm and no farther than 305 mm apart.

4.3.6. The highest horizontal or stepping surface on climbing walls that are linked or functionally linked to composite structure platforms shall not exceed 305 mm above the platform it serves to access for tot structures and 457 mm above the platform it serves to access for senior structures.

4.3.7. The maximum height permitted for a composite structure platform that is linked or functionally linked to a climbing wall shall not exceed 1829 mm.

4.3.8. No rock climbing wall shall be positioned in a manner to function as a sole means to link or access platforms (bridging).

4.3.9. Standards described for climbing walls in clauses 4.3.1, 4.3.2, 4.3.3, 4.3.4, 4.3.5 and 10.6 shall also apply to climbers.

4.3.9.1. Exception to 4.3.2: For rung ladders, flexible components and arch climbers, the stepping surface used for final access shall not be above the designated play surface it serves (CSA-Z614 Transition From Access to Platform).

4.3.10. To prevent injuries from striking lower internal components during a fall, multi-dimensional (spatial geometric) stand-alone and attached climbers shall not incorporate lower, inner horizontal elements that are constructed of metal rungs or chains. (Examples: jungle gyms and castle towers).

4.3.11. 'Fire Towers', 'Mine Shaft' climbers and similarly designed climbers that are constructed of metal rungs or chains and do not incorporate multi-dimensional internal components shall have a minimum internal fall zone of 1800 mm.

4.3.12. 'Chimney' climbers and similarly designed climbers that are constructed of rope or cable shall be exempted from the minimum internal fall zone restriction specified in 4.3.2 above.

4.3.13. Multi-dimensional climbers incorporating internal rope or cable elements shall be reviewed on an individual basis prior to granting approval.

4.4. NATURAL FORM PLAY STRUCTURES

4.4.1. Structures shall comply with CSA-Z614.

4.4.1.1. Natural form play structures require the same fall zone protection and height restrictions as conventional playground equipment.

4.4.1.2. There shall be no sharp edges on wood or rock structures that would have naturally grown or occurred on the component. Sharp edges may include; log knot protrusions, splinters or brittle rock components.

4.4.1.3. Log, rock or other points of intersection must not contain entanglement or head entrapments.

4.4.1.3.1. Log connection points shall have a bushing separation to prevent entanglement.

4.4.1.4. Anchoring of standard equipment such as; logs and rocks shall be achieved.

4.4.1.4.1. Moveable pieces such as; logs, sticks or other comments are not permitted and must be anchored if they are part of the design.

4.4.1.5. Rope ends shall be capped or melted and contain no sharp or unfinished ends.

4.4.2. Design Specifications:

4.4.2.1. Supplier shall provide vendors contact information for natural material used in the development.

4.4.2.2. In the case of damaged or vandalized components, one for one replacement is preferred and shall be procurable. In the case that one for one replacement is not possible, replacement with a similar component or entire removal will be considered as secondary options.

4.4.2.3. Careful selection of vegetation shall contain aspects such as; native species to the area, resilient to traffic and weather conditions and classified as low maintenance. Areas of vegetation shall avoid; invasive species, nettle, poison oak,

hawthorn, rose and blackberry, snowberry, pacific yew, red elderberry or other berry type species.

4.4.2.4. Creative, new natural components or other innovative designs are encouraged; however, shall require further operational approval prior to selection.

4.4.3. Material specifications:

4.4.3.1. Material selection shall be rot and insect resistant.

4.4.3.2. Material shall be North American sourced. Other sources may be considered for review and require approval before material is selected.

4.4.3.2.1. Exception: Accoya is not North America sourced and can be used in development. Exceptions are made for; durable, long lasting and materials that have positive test results for the factors above.

4.4.3.3. Surfacing shall have a natural aesthetic; such as; engineered wood fibre that meet the *CSA* performance requirements. An approved poured-in-place surface material around rotating equipment remains from this standard.

4.4.3.4. Stainless steel shall be used for attachment hardware. All hardware shall have mating ends or threaded inserts to prevent sharp protrusions. Hardware such as; screws or nails that do not have an opposing end shall not be permitted.

4.5. OVERHEAD EQUIPMENT

4.5.1. All overhead equipment rungs shall be free from plastic or rubber coating.

4.6. PLATFORMS

4.6.1. The maximum senior deck height shall not exceed 2438 mm (See 4.6.2 for exception).

4.6.2. A deck higher than 2438 mm shall be permitted if:

4.6.2.1. All barricade panels shall be continuous from floor to roof.

4.6.2.2. The deck shall have a roof (roof shall comply with section 11.0).

4.6.3. The maximum tot deck height shall not exceed 1219 mm.

4.6.4. Spaces between adjacent platforms shall be closed off to prevent crawl through motion and entrapment. Protective infill panels (kick plates) shall be required between all upper and lower decks (Refer to CSA-Z614 for specifications).

4.6.5. Any equipment with uncontrolled motion cannot be attached to platforms that act as transfer stations or service other equipment (such as; track rides).

4.6.6. Functionally linked platforms (including; step pods) shall have a distance no less than 254 mm and no greater than 356 mm apart.

4.7. ROOFS - DESIGN GUIDELINES

4.7.1. Roof designs shall have no accessible hand holds or gripping points on the roof and no reachable ornamental features on top of the roof (flags, chimneys, banners, etc.).

4.7.2. Roof designs shall have no adjacent components/features located in close proximity to roofs that promote access to another roof.

4.7.3. Roofs shall overhang outside of the support posts to make them harder to climb.

4.7.4. Roofs shall have a minimum 30° slope.

4.7.5. Four 3-D enlargement views of all roofs are required along with measurements of the distance between the top of the barrier railing and the bottom portion of the roof.

4.8. ROOFS - UNINTENDED USE AND ACCESS TO ROOF

4.8.1. Equipment design shall not encourage access to the roof. Hazardous use is promoted when the upper surfaces of roofs become directly or indirectly accessible by the relative positioning of:

4.8.1.1. Barrier panels.

4.8.1.2. Climbers having rungs positioned higher than the adjoining deck.

4.8.1.3. Any climbable component higher than the platform.

All efforts shall be made to identify and eliminate hazards during the design review process. The *Review Committee* shall use *professional judgment* to determine hazardous

equipment relationships during design review. If the hazard becomes evident after the installation, the *Review Committee* shall use *professional judgment* to determine whether equipment relationships are hazardous. Identified hazards shall require modification, replacement or removal.

4.9. ROTATING EQUIPMENT

4.9.1. The *COE* has modified *CSA* standards for rotating equipment (see *CSA* definitions 'Rotating equipment'). *COE* standards apply to the full range of angled rotation between horizontal and vertical axis rotational equipment.

4.9.2. Stand-alone vertical, semi-vertical (angled axis) rotational equipment intended for standing or sitting shall not be permitted unless the structural support is the axis (ex: spinner cups).

4.9.3. Upper body rotational equipment intended for grasping, having a diameter greater than 610 mm, shall require a minimum fall zone of 1.8 m and a no-encroachment zone.

4.9.4. Rotating equipment with a diameter of 1219 mm or greater shall be installed over a rubber protective surface that extends a minimum distance of 1.8 m beyond the edge of the apparatus. The fall zone cannot have a surface transition.

4.9.5. Multi-overhead event upper body rotational grasping wheels less than 610 mm are exempt from the *COE* modifications listed above.

4.10. SAND AND WATER TABLES

4.10.1. Sand and water tables shall not be constructed of fiberglass material.

4.10.2. Sand and water tables must have grounding tabs, stainless steel studs or holes for grounding wires. Grounding wires must be enclosed in conduit and be installed at a minimum depth of 51 mm (2 inches) below sub-base.

4.10.3. Sand and water tables must drain freely.

4.11. SLIDES

4.11.1. The maximum acceptable height for all starting platforms shall not exceed 2438 mm (See 4.11.2 and 4.11.3 for exceptions).

4.11.2. A deck higher than 2438 mm up to a maximum of 2743 mm shall be permitted if all of the following conditions are met;

4.11.2.1. The deck shall have a roof which complies with our standard.

4.11.2.2. All barricade panels shall be continuous from floor to roof (including slide entrance).

4.11.2.3. No opening shall exist between top of slide sidewall and deck vertical support. The sitting section shall have guardrails, handholds and a means of forcing the user to sit down (sit-down bar, hood, guardrail, etc.).

4.11.3. A deck higher than 2743 mm shall be permitted if all of the following conditions are met (in addition to 4.11.2 above);

4.11.3.1. Current CSA Z614 shall be maintained.

4.11.3.2. Engineering controls including; flanges or physical blockades shall be present to eliminate or deter climbing of slide or slide components.

4.11.3.3. Administration controls including; signage shall be present to eliminate or deter climbing of slide or slide components.

4.11.3.4. Designated play surfaces on, near or around elevated slide components shall not be present.

4.11.3.5. Fall protection surfacing must meet Head Impact Criteria and fall height requirements from the max slide height through supplier documentation.

4.11.3.6. All play apparatus points requiring regular inspection and maintenance by the owner/operator shall be at a height which is accessible through non-certification based inspection and repair methods. The height, without the requirement for a Fall Protection system, is 3.0 metres at foot level plus the average height of an individual (168 cm or 5 ft. 5 in.)

4.11.3.7. Slide shall be fully enclosed.

4.11.4. All above ground slides shall be stainless steel. To minimize solar heating of the sliding surface, slides shall be positioned with chutes facing between northwest and east locations.

4.11.5. All slides shall be designed and installed to eliminate all entanglements (See Playspace Equipment Standard, section 'Testing Methods').

4.11.6. Slide exit points shall be installed over a Pour-in-Place or wear matt rubber protective surface. It shall be installed 150 mm below the top of the loose fill material (EWF/sand) underneath loose fill surfacing. This shall extend a minimum distance of 1.2 m beyond the edge of the apparatus.

4.12. SWINGS

4.12.1. Senior swing belt seats and tot swing bucket seats shall not be located within the same bay.

4.12.2. Senior swing crossbar heights shall be between 2438 mm and 3048 mm above the protective surface.

4.12.3. Chain shall be a minimum of grade 40 steel with a corrosion-resistant coating and shall have a minimum gauge of 6.4 mm (1/4 inch). The working load limit shall be minimum 590 kg (1300 lbs.).

4.12.4. Installed senior swing seats under load shall be between 406 mm minimum and 508 mm maximum above the surface.

4.12.5. Tot bucket swing seats shall be between 610 mm and 762 mm above the protective surface. Tot swing crossbar heights shall be between 2134 mm and 2438 mm above protective surface.

4.12.6. Concrete footings shall be a minimum of 610 mm deep (measured from the bottom of the hole to the top of the clay surface, with vertical or angled-drilled holes and 305 mm in diameter. An anchoring bar shall be inserted through the vertical support at a minimum 305 mm depth.

4.12.7. For swings that incorporate two single vertical posts as structural supports, the concrete footings shall be a minimum 762 mm deep and 610 mm in diameter. An anchoring bar shall be inserted through the vertical support at a minimum 305 mm depth.

4.12.8. (NEW 2019) For swings that have loose fill protective surfacing, a poured-in-Place or rubber wear mat shall be installed 150 mm below the top of the loose fill material (EWF/sand). Each swing seat shall have a rubber wear area with a minimum width of 1.0 m,

a minimum length of 1.6 m, and a minimum thickness of 75 mm. Bucket style swing seats for ages 18 months to 5 years are exempt.

4.13. TELESCOPES

4.13.1. Telescopes shall not have the ability to retain liquid.

4.14. ZIP LINES AND TRACKS

4.14.1. Cable zip lines - After trialing cable zip lines from 2015 to 2021, they require ongoing maintenance, adjustment and attention and are now prohibited for any new or redeveloped playground. Track ride style zip tracks are the preferred style of this equipment type.

5. OTHER HAZARD CONTROLS

5.1. Above grade cross-structural bracing systems shall not be permitted in the COE. Footings cannot protrude above the sub-base. If a sub-base grade elevation change exists, the footing shall conform to grade.

5.2. Equipment attached to decking (chain ladders, slides, arch climbers, fire poles, etc.) shall be anchored in concrete. Pinning in clay is not acceptable. Ground bound ends shall be secured in concrete footings with a minimum depth of 610 mm and a minimum diameter of 152 mm. There shall be a minimum depth of 305 mm surfacing above the anchor.

5.3. Talk tube pipes and mounting clamps shall be buried below the top of the subgrade.

5.4. All mis-drilled holes on playground structures shall be filled with the appropriate material; such as a rivet or weld.

5.5. To prevent post-settlement of poured-in-place safety surfacing sub-base, any mis-drilled piling hole shall be filled in with clay and compacted to sub-grade.

5.6. All threaded fasteners shall be secured with threadlocker or a type of locking nut.

6. OUTDOOR FITNESS EQUIPMENT

6.1. Outdoor fitness sites must meet Playground protective surfacing standards.

6.2. Outdoor fitness sites must include suitable drainage.

6.3. This equipment shall mirror the protective zone requirements for stationary equipment in CSA.

6.4. For other equipment standards, refer to ASTM F3101 − 21a Standard Specification for Unsupervised Public Use Outdoor Fitness Equipment

7. PROHIBITED PLAYGROUND EQUIPMENT

Types of prohibited equipment:

- Statues intended as art
    - Exception: Must be physically interactive, climbable and must meet *CSA* protective zones to be accepted.
- Tube see-saws
- Spring toys with chain
- Mesh decks and mesh in-filled components
- Poly/plastic bubble panels
- Pressure-treated wood
- Sectional rubber safety tiles
- Poly/plastic slides
- Roller slides
    - Roller slides are an accessible component to accessible/inclusive playgrounds. Depending on design, they can be reviewed on a case-by-case basis. Roller slides must be free of finger entrapments or entanglements.
- Playground carpet protective surfacing
- Teeter-totters with automobile tires as shock-absorbing material
- Cable Wire Zip Lines

8. PROTECTIVE SURFACES

8.1. Regardless of the type of protective surfacing, all playground footprints shall have compliant weeping tile that allows sub-drainage from the footprint to an approved outflow system.

- All weeping tile intersections shall have angles less than ninety degrees.

8.2. The following safety surfacing materials are approved for use:

- Engineered wood fiber
- Poured-In-Place rubber
- Sand
    - Sand cannot be used as a protective surfacing adjacent to other loose surfacing types and shall be contained within its own borders. Acceptable surface type is to use a uniform material.
- No change of surfacing within fall zones.
- A single type of surfacing is preferred to limit cross contamination of loose materials within each other or migration onto poured-in-place surfacing.
- Other alternative materials may be considered and shall be subject to the new product approval process.
- Drainage: all playground footprints shall have compliant weeping tile that allows sub-drainage from the footprint to an approved stormwater outflow system.

8.3. The minimum standard for depth of loose fill at installation shall be 356 mm. The minimum standard for depth of loose fill after settling shall be 305 mm.

9. SPRAY DECKS

9.1. No climbable structures.

9.2. No features designed for exiting into pools of water (ie. Water slides).

9.3. No Loose surfacing within 10 metres around spray decks.

9.4. A separate standards document will need to be established.

10. TESTING METHODS

10.1. See all testing methods in the current CAN/CSA-Z614.

10.2. Testing method for all playground safety surfacing shall refer to playground Safety surfacing impact testing protocol. The playground

shall remain closed until all testing protocol has been implemented and compliance achieved.

11. WHEELED SPORT FACILITIES

11.1. A wheeled Sports Facility include but not limited to; skate parks or bicycle circuits.

11.2. See Appendix E for details.

PART C. ADDITIONAL CONSTRUCTION STANDARDS

12. ANNEX H

The *COE* expects developers and suppliers to be designing and building barrier free playgrounds. They are required to provide support and increasing opportunities for people of all abilities to grow and learn together through outdoor play. The framework for this is provided in *annex H* of the CSA Z614 standards.

The scope of this annex does not include the area surrounding or beyond the playground including, but not limited to, parking, washrooms, drinking fountains, and recreation facilities.

Note: For more information about accessible design beyond the playground see CSA B651.

13. TEST/TRIAL AND PROHIBITED EQUIPMENT

New equipment can be installed and tested on a trial basis. The trial period may differ for different pieces of equipment; however, may be up to a 5 year period. Trial equipment that has become deficient or is not meeting expectations must be communicated to the Project Manager and Supplier by FAC (final acceptance certificate) award. See prohibited equipment list, section 7.0. On a case-by-case basis, the City reserves the right to request additional warranty periods on trial equipment.

14. EQUIPMENT LAYOUT DESIGN APPROVAL PROCESS

The general process for approving equipment layout design plans shall be as follows:

- Site development plan to be confirmed and approved prior to finalization of equipment layout design. Fencing, lighting, walkways, washrooms, storage, emergency phone, trees, park furniture, trash units, etc. are amenity considerations for playspace facilities on a project-by-project basis accounting for location, surrounding and adjacent uses.
- *Review committee* will review the proposed equipment layout.
- Supplier will be contacted about equipment and/or layout concerns identified by the *Review Committee* and given the opportunity to give feedback and/or suggest alternate equipment or layout.
- Final equipment approval by the *review committee* and project can proceed to the construction detail phase when all funding is in place.

- All design changes shall be solely communicated through the *COE* project manager for approval, prior to implementation.
- Playground equipment shall be constructed and installed according to specifications as shown on the approved design plan, notes and manufacturer's specifications. Equipment suppliers' plans shall include the following:
    - Project title/description
    - Equipment layout plan revision # and date of revision
    - Provide an itemized list of equipment installed
    - Listing/logo of each Equipment Supplier represented
    - Statement of *CSA* compliance
    - Specified protective surface zones around the equipment with no change of surfacing within entry
    - Specified no-encroachment zones
    - Heights of all decks/platforms, overhead apparatus and swing cross-bars
    - Built-in scale
    - 3-D drawings from all 4 angles
    - 3-D drawings of all roofs in Playground design
    - Roof heights showing distances from all climbable structures and components
    - Installation detail for roof design
    - Table specifying the number and type of ground level play components confirming accessible requirements according to Annex H
    - Age-specific designation for applicable equipment
    - PDF version of the AutoCAD drawing
    - AutoCAD drawing (.dwg)
    - Drawing in metric to scale
    - Drawing in 2D

- All drawing layers turned on that are required for use by *COE* (ie: play apparatus, fall zones, labels, pour in place layout, piles)
- Equipment drawn in the Playground pod
- Equipment labeled
- Pile layout for all equipment
- Fall height chart
- PDF highlighting the piles the installer requires to be staked by Survey
- *CSA* conformance disclaimer

15. IDENTIFICATION AND CORRECTION OF DEFICIENCIES

The inspectors are authorized to identify and prioritize deficiencies by applying The *Canadian Standards Association* standard (*CSA*), The *COE* playground standard and their *professional judgment* in order to identify hazardous conditions and maintenance concerns.

Deficiencies shall be documented on the "City of Edmonton – Playground Construction Final Inspection Report". In determining or clarifying a deficiency and its severity, the inspectors are authorized to:

- Assign class hazard criteria to prioritize correction deadlines.
- Quote references from, or provide an interpretation of *CSA* and the *COE* playgrounds standards manuals.
- Document deficiencies in cases where no written standard currently exists.

The *review committee* shall make every effort to identify and correct hazards and maintenance concerns on the plan prior to the installation. They shall use their *professional judgment* to determine deficiencies pertaining to equipment relationships that encourage hazardous use on plans and as-built composite structures.

All equipment deficiencies shall be corrected by the supplier and approved by the *review committee.*

16. EQUIPMENT HAZARD CLASSIFICATION

The Inspectors shall assign class hazard criteria* to indicate the nature and priority of repairs:

EQUIPMENT HAZARD CLASS	CRITERIA*	NATURE OF CORRECTION	CORRECTION TIMELINE upon issuance of the inspection report
CLASS 'A'	Any condition which has the potential to be life threatening or can cause severe, permanent injury.	Equipment shall be removed, modified or replaced	The playground will not be opened until deficiencies are completed.
CLASS 'B'	Any condition which has the potential to cause serious but non-disabling injury.	Equipment shall be removed, modified or replaced	The playground will not be opened until deficiencies are completed.
CLASS 'C' Equipment hazards and all construction-related deficiencies	Any condition which can cause slight injury, or may not have caused injury but does not meet current standards.	Equipment may be removed, modified, replaced, or be placed on a one year trial and monitored, or require no action or follow-up	14 working days or as negotiated

*Hazard priority ranking classification adapted from The International Loss Control Institute. Currently published in The Consumer Product Safety Commission (C.P.S.C.) Playground Audit Guide.

PART D. RESPONSIBILITIES OF THE SUPPLIER / CONTRACTOR

17. RESPONSIBILITIES OF THE SUPPLIER / CONTRACTOR

The supplier shall provide a CPSI certified installer for playground equipment. The certified installer shall be on site at all times during the installation of the playground equipment.

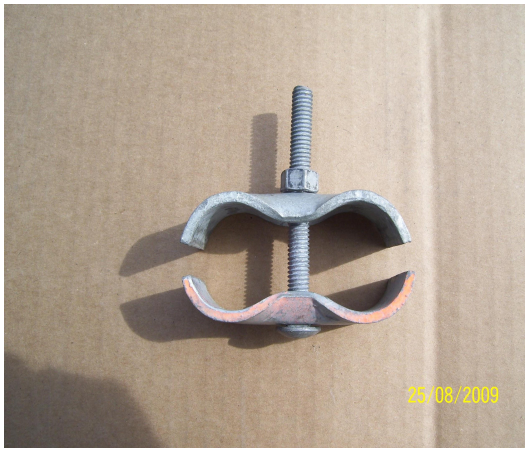
The playground site shall not be opened until all deficiencies are corrected and the CCC is issued. Only the *COE* playground inspector shall collaborate with the project manager to remove the security fencing, if appropriate for the stage of the site development.

The supplier is responsible to provide the *COE* with a fully stocked maintenance kit and a manufacturer's installation / maintenance manual upon the completion of each playground installation before the playground will be opened. These will include detailed specifications for each component.

The project manager or contractor shall provide a timeline charter to the Team Leaders before construction begins.

18. CONSTRUCTION SPECIFICATIONS

- The security fencing shall be 1829 mm. Each panel shall be attached to adjacent panels with fastening brackets similar in design to the example shown in the pictures below. The minimum size of fastening hardware shall be 9/16” nut and 3/8” bolt.



- Clay footings are not allowed. Alternatives for large footings are concrete or soil cement.
- Refer to Volume 5: Landscape Design and Construction Standards for vegetation requirements around playgrounds. Reasonable judgment must be

used to avoid deciduous plants near playground surfacing. There shall not be any plant material within equipment no encroachment zones.

19. WARRANTY REPLACEMENT WORK AND MAXIMUM REPLACEMENT TIMES

Approved *COE* suppliers shall ensure that replacement parts are available within the CCC warranty period. The time is as follows:

TYPE OF EQUIPMENT	TIMELINES
Fasteners & Bolts	5 working days or as negotiated (AMEND 2019)
Common Wear & Tear Components Moving and Swivel Components	7 working days or as negotiated (AMEND 2019)
Cables, Ropes & Connectors	14 working days or as negotiated (AMEND 2019)
Technical or Electronic Replacement Parts	7 working days or as negotiated (AMEND 2019)
Manufactured Structural Components	Within 6 weeks or as negotiated (AMEND 2019)

20. PROTECTIVE SURFACING INSTALLATION AND SPECIFICATION

20.1. Poured-In-Place Rubber Surfacing

20.1.1. See appendix F for details.

20.2. PLAYGROUND SAND

20.2.1. Scope

Supply and delivery of sand to be used for playground construction.

20.2.2. General

20.2.2.1. Sand shall be uniform, natural and coarse and conform to the specifications in this section.

20.2.2.2. Sand shall be free from vegetation, clay balls or other extraneous material.

20.2.2.3. All sand shall be washed and conform to the sieve analysis shown below.

20.2.2.4. Sand shall contain no more than 2% of lightweight pieces floating on a liquid of specific gravity 2.0.

20.2.2.5. The allowable moisture content shall be 4% based on the dry weight of sand. If the moisture content is higher than the weight of water in excess of 4% shall be computed and deducted from the total weight of sand supplied.

20.2.3. Selection

20.2.3.1. The source of the sand must be submitted with the tender and approved by the project manager before the commencement of operations.

20.2.3.2. The contractor shall use reasonable care in the selection of material from a pit so as to produce a uniform product.

20.2.4. Sieve Analysis

20.2.4.1. When tested by means of laboratory sieves, the sand shall meet the following grading requirements and be uniformly graded between the limits:

Sieve Size (mm)		**% Passing by Mass**
1.25 mm	(No. 16)	85 - 100
0.8 mm	(No. 20)	48 - 70
0.315 mm	(No. 50)	2 - 30
0.16 mm	(No. 100)	0 - 6
0.063 mm	(No. 200)	0 - 1

20.2.4.2. Sieve analysis and sample for the sand shall be provided with the tender. Samples shall be approximately 2 to 3 kilograms contained in plastic lined jute bags. The type of material bagged shall be clearly identified.

20.2.5. Delivery, Storage and Handling

20.2.5.1. One grading test shall be taken for every 300 tonnes of sand produced.

20.2.5.2. Sand Delivered to a Stockpile

When sand is to be delivered from the screening/washing plant to a stockpile the average grading of the first eight consecutive sieve tests shall confirm to the specified grading band. If they do not, then the production process shall be adjusted so that average grading of the first eight tests and the subsequent eight consecutive tests confirms to the specifications. If this does not happen then the sand produced should not be transported to the stockpile.

20.2.5.3. Sand Delivered Directly to Site

- When sand is not delivered from the screening/washing plant to site, then the average grading of any three consecutive tests shall conform to the specified grading band.
- The contractor should be prepared to deliver to site or sites indicated within the *COE* upon receipt of 48 hours notice.
- Sand may be inspected and tested at any time during the contract period as directed by the project manager. If the material does not conform to the specification, then it may be rejected and delivery refused.
- Non-compliant sand already delivered to site shall be removed by the contractor at the contractor's expense within 24 hours. If the sand is not removed within the designated time frame, then it will be removed by others and the cost of the removal will be charged to the contractor. Supply and delivery costs for rejected sand will not be paid.
- Random sampling will be submitted for testing.

20.2.5.4. Truck Size and Capacity

- The capacity and type of the truck the contractor proposes to use to deliver sand shall be submitted to the project manager for approval prior to the start of the contract.
- The use of semi-trailer type units may be restricted when hauling sand to certain sites.
- Trucks may be measured for size during the contract as determined by the project manager. Trucks falling outside of the previously approved limits shall be removed from service immediately.

20.2.5.5. Load Limits

- The loading of trucks will be subject to the *COE* Traffic Bylaw No. 5590.
- In addition, the project manager may further limit the loading of trucks to prevent spillage of material or damage to public thoroughfares.

20.3. ENGINEERED WOOD FIBRE (EWF)

20.3.1. Scope

- Notwithstanding other mulch that may be supplied to COE, engineered wood fibre (EWF) is very specific to playground safety surfacing. The following specifications shall be adhered to for EWF when supplied to *COE* for playground construction tenders.
- The supply and delivery of EWF for playground safety surfacing and accessibility during a playground construction project must adhere to the following specifications.

20.3.2. General

20.3.2.1. EWF shall be uniform and natural in composition and conform to these specifications as well as any manufacturer specifications of the supplier.

20.3.2.2. EWF shall be free from vegetation or other extraneous material. The fibre should come mainly from deciduous trees and not contain such items as; bark, twigs or coniferous needles.

20.3.2.3. All EWF shall be clean, free from prohibited materials (peat moss, manure, raw compost, paper products, plastics, rubbers, gelatinous sprays, plywood or other lumber containing chemical adhesives or wood preservatives) and must conform to the sieve analysis shown below.

20.3.2.4. EWF shall be of high quality; free from diseases, molds, fungi and insect infestations. All organic fibre shall be free of inorganic materials (metal, glass, rock and other foreign materials).

20.3.2.5. EWF shall contain no more than 2% of dust floating on a liquid of specific gravity.

20.3.2.6. The allowable moisture content shall be no more than 2%.

20.3.3. Selection

20.3.3.1. The source of the EWF must be submitted with the tender and approved by the project manager before the commencement of operations (please see approved supplier listing prior to bid submission).

20.3.3.2. Substitutions during the construction season will not be allowed unless the new supplier meets the requirements and has filled out a new supplier application.

20.3.3.3. The contractor shall use reasonable care in the selection of material as to produce a uniform product, so that it will meet the following sieve analysis.

20.3.4. Sieve Analysis

20.3.4.1. When tested by means of laboratory sieves, the EWF shall meet the following grading requirements and be uniformly graded between the limits:

	Minimum	**Maximum**	**Total**
3/4“	99%	100%	100%
3/8“	75%	100%	86%
No. 16	0	15	12

20.3.4.2. Samples for the EWF shall be provided with the tender. Samples shall be approximately 2 to 3 kilograms contained in plastic lined jute bags. The type of material bagged shall be clearly identified.

20.3.5. Delivery, Storage and Handling

20.3.5.1. EWF Delivered to a Stockpile

When EWF is to be delivered from the mill to a stockpile the average grading of the first eight consecutive sieve tests shall conform to the specified grading band. If they do not, then the production process shall be adjusted so that average grading of the first eight tests and the subsequent eight consecutive tests conforms to the specifications. If this does not happen then the EWF produced should not be transported to the stockpile.

20.3.5.2. EWF Delivered Directly to Site

- When EWF is to be delivered from the mill, the average grading of any three consecutive tests shall conform to the appropriate sieve analysis prior to shipping from the mill. This analysis must be provided to project manager early in the spring of each construction season before any release to site.
- The contractor should be prepared to deliver to site or sites indicated within the *COE* upon receipt of 72 hours notice.
- EWF may be inspected and tested at any time during the contract period as directed by the project manager. If the material does not conform to the specification then it may be rejected and delivery refused.

Non-compliant EWF already delivered to site shall be removed by the supplier at the supplier's expense within 24 hours. If the EWF is not removed within the designated time frame, then it will be removed by others and the cost of the removal will be charged to the supplier. Supply and delivery costs for rejected EWF will not be paid.

20.3.5.3. Truck Size and Capacity

- The capacity and type of the truck's the contractor proposes to use to deliver EWF shall be submitted to the project manager for approval prior to the start of the contract (A standard tandem 1 ton dump type truck or equivalent is deemed appropriate).
- The use of semi-trailer type units may be restricted when hauling EWF to certain sites.

- Trucks may be measured for size during the contract as determined by the project manager. Trucks falling outside of the previously approved limits shall be removed from service immediately.

20.3.5.4. Load Limits

- The loading of trucks will be subject to the *COE* Traffic Bylaw, No 5590.
- In addition, the project manager may further limit the loading of trucks to prevent spillage of material or damage to public thoroughfares.

20.3.5.5. Base Preparation for EWF Material

Preparing base for EWF product must be done in accordance with the manufacturer's specifications for their product as it may affect warranty.

20.3.5.6. Spreading, Topping and Tamping of Material

Contractor or supplier shall spread fibre evenly throughout the footprint in tamped lifts of 150 mm to an overall settled depth of 305 mm. To ensure the settled depth, the fibre shall be topped up to a minimum of 50 mm above the top of the curbing.

APPENDIX E:
SPECIFICATION FOR WHEELED SPORTS FACILITIES

1. Foreword

This *COE* wheeled sports facilities guideline applies to facilities for skateboarding, in-line skating, roller skating and BMX riding, installed in unsupervised areas. Where supervision is available or where access is controlled different considerations may apply. These facilities generally include manufactured items such as; rails, ramps and pipes on which a wheeled device such as a skateboard or other roller sports equipment can be used.

The guideline specifies safety requirements to protect users and third parties from unforeseen hazards when using the equipment as intended. Requirements are specified for the equipment and recommendations are given for site location.

The guideline does not apply to competition or commercially operated facilities, though many aspects covered by the document may be relevant to such facilities.

The specification includes requirements relating to materials, dimensions and construction of equipment, but specific designs are not given for ramps as these may vary with the type of facility and use.

Compliance with these guidelines is required for all facilities located on city land. The *COE* requires that all skatepark product suppliers must comply with the skatepark product supplier pre-approval process as specified by the *COE* project manager.

2. Scope

This Guideline specifies requirements for facilities for skateboarding, in-line skating, roller skating, BMX riding and non-motorized scooters, installed in unsupervised areas. These facilities include manufactured items such as rails, ramps and pipes on which a wheeled device such as a skateboard or other roller sports equipment can be used.

It applies to ramps, general riding surfaces and to permanent and temporary *street course equipment.*

It does not apply to competition facilities or to commercially operated facilities.

3. Referenced Standards

The following standards contain provisions referenced in this text.

- ASTM Test Method D2583-95 Standard Test Method for Indentation, Hardness of Rigid Plastics by means of a Barcol Impressor
- City of Edmonton Design & Construction Standards Construction Specifications
- Canadian General Standards Board CAN/CGSB-12.12-M90
- Plastic Safety Glazing Sheets
- CSA-Z614
- F08.66.03 Z9571Z American Standards and Testing Materials Standard Guide for Public Use Skate Park.

4. Terms and definitions

For the purposes of this document, the following definitions apply

- *Barrier* - Infill panel designed to stop the user from falling.
- *Commercially Operated Facility* - Facilities which are constantly supervised by the operator and may include an admission fee.
- *Competition Facility* - Facilities which are accessible for the duration of a competition under the supervision of the event organizer.
- *Coping* - Circular tube or bar which is firmly attached to the top of a *transition* or a ramp.
- *Depth* (of a platform) - Dimension in the same direction as the *transition* to the platform.
- *Facility* - Area dedicated to the use of skateboards, roller skates, BMX cycles or other roller sports activities comprises a constructed *riding surface* including; ramps and other structures.
- *Flat* - Horizontal part of the *riding surface* usually between *transitions*.
- *Flat Bank* - *Structure* incorporating one or more constant *riding surfaces* and a platform.
- *Free-Fall Height* - Perpendicular distance between one surface and a lower adjacent surface.
- *Grind Rail* - Curb or rail along which it is possible to grind or slide.

- *Half-Pipe* - Pipe consisting of two platforms separated by two opposite *transitions* and a lower flat section.
- *Jump Ramp* - *Ramp* without a barrier, guardrail or platform.
    - NOTE: Jump ramps are sometimes known as “wedge ramps”.
- *Platform* - Flat surface at the top of a *ramp* and/or *transition*.
- *Professional Judgment* - Where an interpretation is necessary, *COE* safety inspectors use professional judgment to ensure that there is compliance to the Standard.
- *Quarter Pipe* - Pipe consisting of a single *transition* surmounted by a platform.
- *Ramp* - *Structure* incorporating one or more *transitions* and/or straight profiles.
- *Riding Surface* - Surface on which wheels are intended to be used.
- *Run-Up* - Space which is required for safe wheeled access to a structure.
- *Run-Out* - Space which is required for safe wheeled exit from a structure.
- *Safety Area* - Area around a *structure* or *facility* necessary for its safe use.
- *Spine Ramp* - *Ramp* incorporating two opposite *transitions* forming a ridge.
- *Street Course Equipment* - Items other than half-pipes which may be used for wheeled sports.
- *Structure* - Constructed features forming a *riding surface.*
- *Transition* - Connection of curved profile between two levels of a *riding surface*.
- *Wall Ramp* - *Ramp* leading to a vertical surface.

5. Dimensions

General

If a wheeled sports facility is provided for use in conjunction with a playground, it shall be clearly separated from the general play area by a space at least 25 m wide and/or by a physical *barrier* at least 1200 mm high.

No *free-fall height* from a *platform* shall exceed 1000 mm unless barriers are provided. No *ramp* shall rise to a height of more than 2000 mm. Exceptions may be granted for competitions.

Accessible metal edges shall be rounded off with a minimum radius of 3 mm.

Where *ramps* abut *run-up* surfaces, the change in levels between the *run-up* surface and the *ramp* shall not exceed 5 mm.

NOTE: A maximum change in levels of 3 mm is preferred

Coping Ramp

- A *coping ramp* is a skateboarding *facility* with a *coping* to enable tricks to be performed along the edge.
- The radius shall be minimum 1800 mm.
- The *coping ramp* shall be provided with a platform. This *platform* shall be minimum 900 mm deep. At the top end of the *transition*, there shall be *coping* along the entire width of the ramp.
- If the *ramp* is greater than 1000 mm in height, then crash barriers are required for the *platform* area of the ramp.
- With an overall height greater than 1000 mm, the dimensions of the platform, *barrier* and skateboarding surfaces width and radius shall correspond to the respective dimensions of the mini-pipe (see Table 1).

Flat banks

- *Flat banks* shall not exceed 3000 mm in height and should be at least 1200 mm wide.
- *Flat* banks higher than 1000 mm shall have barriers.

Grind Rail/ Curb

- The height of the *grind rail* shall be at least 150 mm measured from the *riding surface*.
- The *grind rail* shall be at least 50 mm wide.
- If the height of the *grind rail* exceeds 600 mm, the space between the underside of the rail and the ground shall be filled. The width of the infill shall not exceed the width or diameter of the rail.
- A curb simulates the edge of a pavement and makes it possible, for example, to skateboard along it.
- The curb shall be a minimum of 150 mm and a maximum of 1000 mm high.

- The curb shall be 40 mm minimum width.
- One or two pipes may be installed on the curb.

Mini Pipes

- A mini pipe is a skateboarding facility consisting of two adjacent *transitions* connected by a flat, the radii of which do not reach vertical. The ends of the mini-pipe are formed by platforms.

  The following types are allowed:

  Type 1: Track without *barrier* or profile edge

  Type 2: Track with profile edge

  Type 3: Track with barrier
- The radius of the mini pipe shall be a minimum 1800 mm or at least 1 to 2 times the height.
- A height h of a maximum 2000 mm is permissible. Up to a *platform* height of 1250 mm, a minimum width of 2400 mm shall be complied with. If this height is more than 1250 mm, the minimum width is 3600 mm. If a mini-pipe is provided with a barrier, its width shall be minimum 5000 mm.
- The *platform* shall be fitted with crash barriers depending on the free fall height. The length of the platforms shall be a minimum 1200 mm and a maximum 1500 mm.
- The length of the *flat* shall not be less than the radius.

Table 1: Dimensions of a Mini-Pipe

Type	**Height** *h*	**Width** *b*
1 and 2	≤ 1 250	≥ 2 400
1 and 2	≥ 1 250	≥ 3 600
3	< > 1250	≥ 5 000

Half-pipes

- The width of a *half-pipe* shall be at least 2400 mm.

  NOTE: Greater heights may require increased widths.

- Platforms shall extend over the full width of the half-pipe. If the height of the *platform* is 1200 mm or less the *platform* shall have a *depth* of at least 900 mm. If the height of the *platform* is greater than 1200 mm the *platform* shall have a minimum *depth* of at least 1200 mm to a maximum 1500 mm. Platforms should be provided with crash barriers of minimum 1000 mm height.
- It shall only be possible to reach the platforms via the *riding surface*.
- If the *transition* reaches vertical height of the vertical section of a *half-pipe* shall not exceed 450 mm. The vertical section shall be fitted with *coping* along its entire upper edge.

  NOTE: The *half-pipe* should be constructed in a way that does not facilitate climbing. Exceptions may be granted for competitions.
- The radius of a half pipe shall be a minimum 2400 mm and a maximum 3000 mm.
- The length of the *flat* shall not be less than the radius.

Table 2: Dimensions of a Half-Pipe

Type	Height h	Width b
1 and 2	≤ 1 250	≥ 2 400
1 and 2	≥ 1 250	≥ 3 600
3	< > 1250	≥ 5 000

Jump Ramps

- The upper edge of a *jump ramp* shall be rounded off with a minimum radius of 3 mm and may be 40 mm to 100 mm wide.
- A *jump ramp* shall be at least 150 mm high and no more than 1000 mm high. The *ramp* shall be at least 200 mm wide.
- The radius shall be a minimum of 1800 mm.

Quarter pipes

- The *quarter pipe* shall be provided with a platform. If the height of the *quarter pipe* is 1200 mm or less, the *platform* shall have a *depth* of at least 900 mm. If

the height of the *quarter pipe* is greater than 1 200 mm, the *platform* shall have a *depth* of at least 1200 mm.

- The minimum width of a *quarter pipe* shall be 1 200 mm.

  NOTE: Greater heights may require increased widths.

Spine Ramps

- The height of a free-standing *spine ramp* shall not exceed 1500 mm. The maximum overall height of a *spine ramp* shall be 2000 mm.
- A *spine ramp* shall have two copings at its apex.
- The width of a *spine ramp* shall be at least 1200 mm.

  NOTE: Greater heights may require increased widths (Refer to Table 3).

Table 3: Dimension of a *Spine Ramp*

Overall Height *h*	**Width** *b*
≤ 1000 > 1000 ≤ 1250 > 1250 ≤ max. 1500	≥ 1200 ≥ 2400 ≥ 3600

Wall ramps

- A *wall ramp i*s a skateboarding *facility* which gives way to a vertical wall. The wall against which the *ramp* stands shall be vertical and smooth. The total height of the wall shall be at least twice the overall height of the *ramp* measured at the end that abuts the wall. The *ramp* shall be securely attached to the wall.
- The width of the *ramp* shall be a minimum 2400 mm.
- The overall height of the *ramp* shall correspond to the radius of the *transition*.
- The radius shall be a minimum of 1500 mm to a maximum 2000 mm.

6. *Design*

Calculation

The strength, load bearing capacity and stability of the platforms and *riding surfaces* shall be calculated in accordance with CSA-Z614 The calculation for *riding surfaces*

shall be based on a loading of two users per 1 m length. These calculations shall be documented.

Stability

Ramps and other structures shall be secured by their dead weight or by non-removable ground anchors.

Riding surface

The *riding surface* shall be cambered or inclined to permit drainage.

There shall be no projections, other than copings, exceeding the thickness of the material and not exceeding 3 m on, to or within the *riding surface,* including joints between *transitions* and flats, but excluding expansion joints.

The gap between surfaces at expansion joints shall not exceed 5 mm.

> NOTE: A maximum gap of 3 mm is preferable.
>
> Asphalt used for *riding surfaces* shall conform to The COE Standard Construction Specifications # 400 - # 440. 'Sandy half' mix is recommended.

Barriers

Barriers shall be fitted where there is a *free-fall height* greater than 1000 mm on quarter-pipes, half-pipes and *flat banks*.

> NOTE: Where street course platforms have a *free-fall height* greater than 1200 mm, a *barrier* is required.

Barriers shall be at least 1000 mm high. No opening within a *barrier* shall have a dimension greater than 100 mm.

> NOTE: Barriers should be constructed in a way that does not facilitate climbing.

Barriers shall be able to sustain a loading of 2L, where L is the loading requirement specified in CSA –Z614.

> NOTE: The doubling of the loading specified in CSA-Z614 allows a dynamic element for collisions at speed.

There shall be a horizontal gap of 150 mm to 400 mm between the *coping* of a quarter-pipe, *half-pipe* or *flat* bank and the end of the *barrier* that extends along the *depth* of the platform.

Safety Areas

NOTE 1: The *safety areas* may overlap if the equipment forms a continuous course unless otherwise specified.

NOTE 2: *Safety areas* are not intended for use by spectators. Spectator areas designed into a facility can be considered and will be reviewed as non-encroachment zones on an individual design basis.

General

Safety areas shall be clear of obstacles. *Safety areas* may overlap.

Bank and Jump Ramps

The width of the *safety area* around jump ramps shall be at least 2000 mm at the sides and at least 3000 mm minimum to 5000 mm maximum (for maximum allowable height) behind.

NOTE: Consideration should be given to increasing this distance in proportion to the height of the *ramp* up to the maximum allowable height.

Spine Ramps and *Coping* Ramps

The width of the *safety area* around both *spine ramps* and *coping* ramps shall be at least 2000 mm at the sides and at each end.

NOTE: Consideration should be given to increasing this distance in proportion to the height of the ramp.

Wall Ramps

The *safety area* for a *wall ramp* shall be at least 5000 mm long in front of the *ramp* and at least 2000 mm wide at each side.

NOTE: Consideration should be given to increasing these dimensions in proportion to the height of the ramp.

Quarter-Pipes, Half-Pipes and *Flat Banks* with a height of less than 1900 mm

Quarter-pipes, half-pipes and *flat banks* where the height from the base level to the *platform* is less than 1900 mm shall be provided with a *safety area* on both sides, except on a side which is placed against a smooth-surfaced wall. This *safety area* shall be at least 2000 mm deep.

A *safety area* shall extend for at least 3000 mm from the front of the pipe, unless the area has means to restrict access.

Quarter-Pipes, Half-Pipes and *Flat* Banks with a height equal to or greater than 1900 mm

Pipes where the height of the curved section is equal to or greater than 1900 mm shall have a *safety area* at least 3000 mm deep on each side.

A *safety area* shall extend for 3000 mm from the front of the pipe, unless the area has means to restrict access.

Copings and Profile Edges

Copings shall project from the *platform* or *riding surface* by no more than 12 mm.

The diameter of *coping* shall be at least 40 mm and no more than 80 mm. The wall thickness of any tubing shall be at least 3 mm.

The ends of the *coping* shall be sealed.

If two copings are used, they shall be arrayed in parallel. If the distance between two copings is greater than 8 mm, the space between the axial dimension of the pipes shall be designed to be sealed.

Profile Edge

Can be provided along the entire length of the skateboarding surface.

The height of the profile edge above the skateboarding surface and width shall be 45 mm +- 5 mm.

If a pipe is not used as a profile edge, the side surface of the respective profile edge construction shall not deviate from the vertical by more than 10.

Entrapment

The entrapment requirements of F08.66.03 Z9571Z shall apply throughout the *facility* (including ancillary items).

Fixings

Fixings shall conform to CSA-Z614.

> NOTE: All structures and parts thereof for the equipment should be fixed in a manner which minimizes the possibility of unauthorized removal.

7. *Materials*

Flammability

Materials used should be fire-retardant (or have some degree of fire retardancy). Documentation indicating fire retardancy is required.

Metal - Documentation re: toxicity is required

> Metal parts shall be protected against corrosion.
>
> Additional protection should be considered where atmospheric pollution is prevalent. Metals that produce toxic oxides which scale or flake shall be protected by a non-toxic coating.

Synthetics

When components made of glass-reinforced plastics are tested in accordance with CAN/CGSB-12.12-M90, the layer beneath the gel coat of the glass-reinforced plastics shall not become exposed.

When tested in accordance with ASTM Test Method D2583-95, the resin of the glass-reinforced plastic shall achieve the Barcol hardness quoted by the manufacturer.

The performance of synthetic materials with respect to embrittlement on exposure to ultraviolet light shall be documented.

Documentation shall be obtained from the manufacturer concerning the expected service life of any component made from synthetic material.

Concrete

The concrete mix for concrete castings shall be specified in accordance with

COE Standard Construction Specifications # 200 - # 220.

> NOTE: Engineering calculations for structural integrity of precast concrete components should be available on request.

Concrete used for *riding surfaces* shall be specified in accordance with COE Standard Construction Specifications #200-#220 and shall cure to a characteristic compressive strength of at least 50 N/mm^2 at 28 days, tested in accordance with COE Design & Construction Standards.

Steel reinforcement shall be placed to meet the design calculations, and shall be covered by concrete in accordance with COE Design & Construction Standards, Construction Specifications #200 - #220.

Concrete for foundations shall cure to characteristic compressive strength of at least 30 N/mm^2 at 28 days, tested in accordance with COE Design & Construction Standards, Construction Specifications # 200 - # 220.

The grading of in-ground structures shall conform to COE Design & Construction Standards, Construction Specifications, Section 02310 for in-ground work and Section 03055 for *riding surfaces*.

Dangerous Substances

Confirmation shall be obtained from the relevant suppliers that no substance known to adversely affect health is present in the equipment or facility.

> NOTE: Examples of such substances are asbestos, lead, formaldehyde, coal tar oils, carbolineum and polychlorinated biphenyls (PCBs).

8. Surface of Surrounding Areas

The surface shall be of a bound uniform material. Loose material, e.g. sand, shall not be used. *Riding surfaces* and surrounding surfaces shall be free-draining.

> NOTE: Grass areas should be maintained in good condition. The provision of footpaths to ramps sited on grass is recommended.

9. Ancillary

Fencing, lighting, walkways, washrooms, storage, emergency phone, trees, park furniture, trash units, etc. are amenity considerations for wheeled sport facilities on a project-by-project basis accounting for location, surrounding, and adjacent uses.

Tagging or graffiti of wheeled sport facilities will be reviewed as acceptable on a project-by-project basis or specified areas will be identified for graffiti use by the project design. Maintenance practices regarding tagging should be considered.

APPENDIX F:
POURED-IN-PLACE PLAY SAFETY SURFACING FOR PLAYGROUNDS

1. GENERAL

1.1 SUMMARY

.1 Section Includes:

.1 The construction of synthetic poured rubber seamless surfacing.

.2 Related Sections – COE Complete Streets Construction Specifications:

.1 Aggregates, Section 2.1

.2 Subgrade Preparation, Section 4.1

.3 Granular Base Course, Section 5.1

.4 Concrete Sidewalk, Curb and Gutter, And Slabs, Section 7.2

1.2 DEFINITIONS

.1 Critical Height: Standard measure of shock attenuation. According to CPSC (Consumer Product Safety Commission) No. 325, this means "the fall height below which a life-threatening head injury would not be expected to occur."

.2 COE: City of Edmonton.

.3 SBR: Styrene-butadiene rubber.

.4 EPDM: Ethylene propylene diene terpolymer rubber

1.3 REFERENCES

.1 City of Edmonton Playspace and Wheeled Sport Facility Design and Construction Standards in its latest revision.

.2 CAN/CSA-Z614: Children's Playground Equipment and Surfacing in its latest revision.

.3 ASTM F1292: Standard Specification for Impact Attenuation of Surfacing Materials within the Use Zone of Playground Equipment in its latest revision.

.4 CAN/CSA-B651-18: Accessible Design for the Built Environment in its latest revision.

.5 ASTM F1951: Standard Specification for Determination of Accessibility of Surface Systems Under and Around Play Equipment in its latest revision.

1.4 PRODUCT SUBMITTALS

.1 Product Data required for each type of product indicated:

.1 Product Certificates: For each type of synthetic rubberized play safety surface material, include:

.1 Material content and origin, including SDS (Safety Data Sheet) and product data sheet

.2 Date of manufacture and expiry if applicable.

.3 Material Certificates: to be filled out and signed by specified manufacturer/supplier that specified materials were shipped and in proper amounts for square footage/thickness/colour, including ratio of binder and rubber

.2 Samples for initial selection - include samples of surface system colour options and accessories for selection.

.3 Provide a final sample of chosen material colour and texture of rubberized play safety surface – 100mm x 100mm x 25mm sample of finished surface on confirmed colour and/or colour fleck mix; provide two weeks prior to installation.

1.5 INFORMATIONAL SUBMITTALS

.1 Field quality-control reports.

.2 Warranty Description: Minimum of 5 years, to include warranty against delaminating, premature wear, and to ensure colour fastness.

1.6 CLOSE-OUT SUBMITTALS

.1 Maintenance Data for rubberized play safety surfacing to be included in maintenance manuals.

.2 Furnish extra rubber materials, binder and other materials that match products installed, packaged with protective covering for storage and identified with labels describing contents, project and completion date. Minimum amount required to repair/reinstall 1m^2 of each colour/type of rubberized play surface, including impact layer and wear course in thickness as noted on the drawings, and sufficient for the impact attenuation requirements and as determined by the designated play surface specified in CAN/CSA-Z614. This materials package to be provided at CCC.

1.7 QUALITY ASSURANCE

.1 Source Limitations: Obtain rubberized play safety surface materials, binders, adhesives, primers, and repair materials from single system manufacturer.

.1 Provide secondary materials from source recommended by manufacturer of rubberized play safety surface materials.

.2 Milestone checklist: Ensure the following items are reviewed as acceptable over the course of the construction.

.1 Sub-base grade and compaction.

.2 Check for the correct ratio of binder to rubber as per manufacturers direction.

.3 Confirm ratio of binder to rubber (review mix on site or materials used on site for quantity check) and adequate thickness is installed for both the wear course and the impact course

.4 Completion of HIC testing as per Section 3.5.3 in this document.

2 PRODUCTS

2.1 SYNTHETIC POURED RUBBER SEAMLESS SURFACE

.1 Surface System: Poured-in-place system with wear course over impact course. Provide each layer as required in overall thickness indicated on drawings, tested for impact attenuation according to ASTM F1292 and for accessibility according to ASTM F1951.

.1 Impact Course: Rubber crumb using +5 SBR buffing coloured with pigment containing no metal or lead. Rubber to urethane ratio shall be 15-18% or 1 kg of urethane per 5.7 kg of rubber.

.2 Wear Course: Formulation of EPDM rubber particles, with minimum of twenty-one to twenty-three percent (21-23%) of ethylene propylene-diene-saturated polymethylene main chain along with other organic and inorganic components. Minimum thickness is 25mm.

.1 Wear Course Colours: EPDM coloured crumb shall be used unless otherwise specified. Colour shall not be obtained by way of pigmented binder unless specified or pre-approval is obtained. Coloured rubber shall be colourfast and UV resistant. Colours may be applied as one solid colour, as a combination of variegated speckles or as specified by design

confirmed through selection in as per Section 1.4 of this document.

.3 Binder: Weather-resistant, flexible, non-hardening, non-yellowing, complying with requirements of authorities having jurisdiction for nontoxic and low VOC content. No TDI (Toluene diisocyanate) urethanes will be permitted.

.4 Overall Thickness: Not less than as indicated on drawings or required for critical height as per CSA standards. Layers should be uniform depth based on greatest fall height.

.5 Rubber Crumb: high grade recycled material of uniform size. Reused/repurposed recycled material is not acceptable, unless Contractor provides submittal for COE review and approval. Material must be free of metal or wire and does not contain lead, other toxins, or allergens such as latex.

.6 Primer/Adhesive: Manufacturer's standard primer and weather-resistant, moisture-cured polyurethane adhesive suitable for unit, substrate, and location indicated.

.2 Leveling and Patching Material for Use on Concrete Substrate Below Synthetic Play Surface: epoxy- or polyurethane-based formulation suitable for exterior use and approved by rubberized play safety surface manufacturer.

3 EXECUTION

3.1 EXAMINATION

.1 Areas and conditions within the defined scope of work shall be examined prior to commencement and officially signed off by the general contractor, landscape architect, rubber safety surfacing contractor and project manager as suitable to proceed.

.2 Hard-Surface Substrates: Verify that substrates are satisfactory for rubberized play safety surface installation and that substrate surfaces are dry, cured, and uniformly sloped to drain within recommended tolerances.

.1 Concrete Substrates: Verify that substrates are dry, clean, free from surface defects, and free of laitance, glaze, efflorescence, curing compounds, form-release agents, hardeners, dust, dirt, loose particles, grease, oil, and other contaminants incompatible with rubberized play safety surface or that may interfere with adhesive bond.

.2 Granular Substrates: Compaction testing of granular base course must adhere to Granular Base Course, Section 5.1. Verify that substrates are a minimum of 150mm thick with proper drainage and compacted to minimum 95% S.P.D (Standard Proctor Density). The sub-base contractor shall be responsible for protection of the sub-base area from any damage immediately prior to the rubber safety surfacing installation.

.1 Core pilings for equipment posts shall be filled flush to the top of the granular base course with concrete to prevent sinkholes in the rubber safety surface.

.2 Hand tamping of granular base course may be required in areas difficult to access. In such cases, compaction around the existing posts or supports shall be tamped with a hand block in 50mm lifts, adding moisture (dampen as each lift is applied).

.3 Edges as specified on drawings:

.1 Cast in place concrete edging;

.2 Pre-manufactured rubber curbing.

.4 Subbase should be kept free of ground frost and snow by ensuring the area is covered with tarps.

.5 Proceed with installation only after any unsatisfactory conditions have been corrected.

3.2 DELIVERY, STORAGE & HANDLING

.1 All materials for the work of this Section shall be delivered, stored and handled so as to preclude damage of any sort. Rubber safety surfacing contractor is responsible for protecting all materials related to this work on site.

.2 Materials showing evidence of damage and/or expired use date shall not be used and shall be removed from the site. Materials in manufacturer's sealed containers or unopened packages must be fully identified with brand, type, grade, date of manufacture, class, lot number, expiry date and other qualifying information.

.3 Store materials in original tightly sealed containers or unopened packages. Materials shall be stored out of weather, off the ground, in dry area, in compliance with manufacturer's minimum and maximum storage temperature range, avoiding freezing conditions.

.4 All binder material is to be stored and transported in a temperature-controlled location at 10°C or above.

.5 Materials must be delivered and off-loaded by installation personnel.

3.3 PREPARATION

.1 General: Prepare substrates and edging to receive surfacing products according to rubberized play safety surface manufacturer's written instructions. Verify that substrates are sound and without high spots, ridges, holes, and depressions. Make any required repairs or corrections prior to rubber surfacing installation.

.2 Substrates: Provide sound surface free of laitance, efflorescence, curing compounds, and other contaminants incompatible with rubberized play safety surface.

.1 Repair unsatisfactory surfaces and fill holes, cracks, and depressions.

.2 Prepare concrete substrates with a standard broom finish or mechanically scarify smooth concrete surfaces.

.3 Treat control joints and other non-moving substrate cracks to prevent telegraphing through rubberized play safety surface.

.4 Confirm slope and drainage of subsurface are correct and in place. If a subdrain system is not available, ensure drainage can exit from under the rubber surfacing to adjacent area.

.5 When a rubberized play safety surface is applied after equipment installation, hand tamping of substrate may be required in areas difficult to access. In such cases, compaction around the existing post or support structure shall be tamped in accordance with Section 3.1.2.2.2 above.

3.4 INSTALLATION OF RUBBERIZED PLAY SAFETY SURFACE SYSTEMS

.1 General: Comply with rubberized play safety surface manufacturer's written installation instructions. Install rubberized play safety surface in thickness indicated.

.2 Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit rubberized play safety surface installation to be performed according to manufacturers' written instructions and warranty requirements.

.3 Installation of poured-in-place rubber surfacing shall not be done when ambient temperatures fall below 5 degrees Celsius during installation. Exceptions may be granted upon special request and approval by the COE, in which case necessary heating and hoarding may be required.

Rubber safety surfacing installed outside the specified conditions must still comply with the specified warranty conditions required of this agreement.

.4 Heating and hoarding is required if temperatures remain below 5°C, before 4-hour cure time has elapsed. A consistent temperature of 5°C or above must be maintained inside the hoarding while the surfacing is laid and during the curing time.

.5 Wear course shall be completely installed in one pour per playground pod to eliminate potential for seams.

.6 Provide rubberized play safety surface after installing playground equipment.

.7 Site security may be needed to restrict damage and public access to safety surfacing during curing period. Site security and third-party damage is the responsibility of the contractor.

.8 Rubberized play safety surface: Mix and apply components of rubber play surface system according to manufacturer's written instructions to produce a uniform wear surface and impact-attenuating system of total thickness indicated.

.1 Impact/Wear Course: Spread evenly over prepared substrate to form a uniform layer applied at manufacturer's standard spreading rate in one continuous operation, with a minimum of cold joints. Thickness of impact course should meet ASTM F1292 guidelines. Thickness of surfacing must be consistent throughout play area pod and must match fall height in localized areas.

.2 Edge Treatment: Fully adhere edges to substrate and curbing with full coverage of substrate and sides of curbing. Maintain full thickness required to comply with safety performance requirements. Top of safety surfacing must be level with the top of the adjacent curbing or paved surface. Key cutting the rubber surface to the curbing is recommended to prevent separation and/or joint elevation differences.

.3 Coordinate application of rubberized play safety surface with work of other trades.

.9 Repair procedure for any damaged areas must comply with all specifications noted above, and method of joining the existing rubber safety surfacing to the repaired surfacing shall be proposed by contractor

for review and approval by COE. Vertical butt joints will not be acceptable.

3.5 FIELD QUALITY CONTROL

.1 Testing Services: Testing and inspecting of completed applications of rubberized play safety surface shall take place according to latest version of ASTM F1292 and CSA standards.

.2 The COE or an independent 3rd party will conduct a Triax test on-site field test within 10 to 25 days after installation and before issuance of the Construction Completion Certificate (CCC). A follow-up test(s) may be conducted at the COE's discretion prior to the issuing of the Final Acceptance Certificate (FAC). Any further follow-up test(s) will need to comply with performance criteria as noted below, with the current minimum CAN/CSA-Z614 standard in effect at the time of installation and will be the responsibility of the contractor.

.3 Performance Criteria - Test results performed on the installed rubberized play safety surface using a Triax2000 instrument, conforming to the technical requirements of ASTM F1292) will be required and must confirm less than 200 Gmax and less than 1000 HIC. Field testing will be conducted within temperature range of -5 C and +49 C in a clean condition.

.4 Certify that installed materials meet the latest ASTM F1292 Standard and requirements for minimum depths related to most stringent fall heights as per 3.6.3.

.5 A minimum of 3 tests per playground location, plus 1 test for each piece of equipment with the highest fall height is required to confirm that play surface meets the requirements for safety as defined in the CSA standard.

.6 Perform testing in the presence of the COE Representative and submit site testing readings immediately or immediately notify the COE Representative in the event of a failure.

.7 Submit site testing report including photos of the test locations to the COE Representative within 48 hours of testing.

.8 Remove and replace areas of rubberized play safety surface where test results indicate that it does not comply with requirements.

.9 All test results, compaction reports, as-built grade of subgrade material to be supplied and accepted as information to ensure all criteria are being achieved.

3.6 PROTECTION

.1 Provide protection of surface during curing process until 100% cure is obtained.

.2 The rubber safety surfacing contractor shall be responsible for protection of finished surfaces until completion of construction and sign off.

3.7 CLEAN UP

.1 Clean rubberized play safety surface as recommended by manufacturers.

.2 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers resulting from this scope of the work. The contractor is responsible to repair any damages to equipment that may result from installation or clean up of the binder material.

.3 The contractor is responsible for any damage to existing hard and soft landscape areas impacted by their work (including access and laydown areas) and must restore the damaged areas to previous site conditions. Pre-existing turf must be replaced with topsoil and sod.

3.8 CONSTRUCTION COMPLETION INSPECTION

.1 Construction Completion Certificate (CCC) inspection to be performed upon construction completion of playground.

.1 Visual inspection to confirm correction of deficiencies, including those related to surface finish, interface between curbs, posts and surfacing, uniform colour, along with all criteria noted in Section 3.4.

.2 Contractor submission of accepted quantitative testing results as noted in Section 3.5.

3.9 MAINTENANCE

.1 Maintenance period to commence following approved CCC inspection.

.2 Loose debris such as sand, dirt and small stones on top of the safety surface systems can shorten the life of the surface. Removal of loose debris should be done to extend the life of the complete safety surfacing and must be done in the spring and fall following installation, and prior to FAC. This cleaning to be coordinated with COE Representative prior to

their inspection. Pressure washing is not recommended as it may damage the surface.

3.10 FINAL ACCEPTANCE INSPECTION

.1 Final Acceptance Certificate (FAC) inspection to occur minimum 1 year following approval of CCC.

.2 A visual inspection will be done at FAC and the COE reserves the right to arrange a drop test using a Triax2000 instrument to determine if surface meets testing results required in Section 3.5. Failure to meet test results will require replacement or localized repair.

.3 Further surface safety testing with passing results using a Triax2000 instrument according to CAN/CSA-Z614 standard in effect at the time of installation may be done prior to FAC, if deemed necessary by the City during a visual inspection.

3.11 WARRANTY

.1 Warranty Period: 5 years from date of Construction Completion Certificate acceptance for new construction.

.2 Warranty Period for Maintenance Work: 1 year from date of repair work on full wear/impact course systems. This occurs beyond the initial 5 year warranty period for new construction.

.3 Contractor must repair or replace components of rubberized play safety surface that fail in materials or workmanship within specified warranty period. Contractor to make repairs within 14 days of being notified by COE representative. Failures include, but are not limited to, the following:

.1 Deterioration of surface and other materials beyond normal weathering and wear and tear, and

.2 Separation of material at seams, curbing or playground structures. Expansion of materials resulting in sinking or raising causing a tripping hazard. This would include contraction or expansion of material.

.3 Colour fading of EPDM and yellowing of the binder

.3 Warranty Inspection

.1 Above noted repairs must be done as needed to rubber safety surfacing on an annual basis where required as noted during a COE inspection.

.2 Prior to completion of warranty period, a visual inspection will occur to determine repair required for any deficiencies.

.4 Warranty Work

.1 An extra application of binder must be applied in high wear areas at 3 years into warranty period. Additional applications may be required if deemed necessary by the City.

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