



# TARBA

Toronto and Area Road Builders Association

## **Quality Control Plan**

Production of Recycled Crushed Aggregates

# About TARBA

Founded in 1957, the Toronto and Area Road Builders Association (TARBA) is a leading industry association whose members perform the majority of new road construction and maintenance in the City of Toronto, and municipalities in Halton, Peel, York, and Simcoe Regions.

TARBA is the collective bargaining agent with LiUNA 183, IOUE Local 793, and Teamsters Local 230, negotiating and administering collective agreements on behalf of unionized contractors working in the above municipalities.

TARBA's goal is to promote the betterment of the road-building industry by addressing industry-wide issues with a unified voice and engaging in education and advocacy that champions best practices and the highest construction standards among our members, government departments and agencies, and the public.



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# 1. Introduction

Asphalt and concrete are 100% recyclable and can be reused as valuable construction materials. The main objective is to ensure that all aggregate material recovered from construction projects will be re-engineered and re-used in new construction projects as a replacement for primary aggregates. Re-using concrete and asphalt materials is advantageous from both environmental and economic perspectives. Using recycled aggregate preserves non-renewable resources, reduces our need for new pits and quarries, and lowers energy use and greenhouse gas emissions associated with long-distance truck hauling. Recycled aggregates can often be supplied locally and are more cost-effective than primary aggregate.

Aggregate recycling facilities provide municipalities and contractors with a location to recover reclaimed concrete and asphalt material and the opportunity to reuse a valuable resource instead of throwing it out in landfills or underutilizing it as clean fill. Properly processed or re-engineered recycled aggregate that meets Ontario Provincial Standard Specifications (OPSS) has proven to be a good material for use in road construction, as engineered backfill, and as a base material in many other applications. Used appropriately, recycled aggregate performs as well as or better than primary aggregate in many applications.

The purpose of this document is to provide a technically sound quality control plan for producing, utilizing, and ensuring the quality of recycled aggregates. The producers of recycled aggregates within TARBA utilize the standard procedures and protocols identified in this document.

Adherence to this plan assures quality control of product standards specified in OPSS1010. Individual producers may enhance these requirements to achieve company objectives and/or to meet more particular standards.





## 2. Recycled Aggregate Products

### 2.1 Definitions

**Aggregate** – Granular material used in construction as defined in OPSS.PROV 1010 and OPSS.MUNI 1010. The product may be natural, manufactured, or recycled.

**Deleterious Material** – Materials containing wood, clay brick, clay tile, plastic, gypsum, gypsum plaster, wallboard, and others that could preclude the achievement of OPSS 1010.

**Fines** – Material passing the 75 µm sieve when tested according to LS-601 or LS-602.

**Free of Clay** – The amount of material with a particle diameter less than 2 µm shall not be greater than 1% of the total sample when tested according to LS-702.

**Granular A** – A set of requirements for dense graded aggregates intended for use as granular base within the pavement structure, granular shouldering, and backfill.

**Granular B** – A set of requirements for well-graded aggregates intended for use as granular subbase within the pavement structure and granular backfill. Granular B may be Type I, Type II, or Type III.

**Granular M** – A set of requirements for dense graded aggregates intended for use on unpaved road surfaces and for the maintenance of unpaved shoulders.

**Granular O** – A set of requirements for open-graded aggregates intended only for use as a free-draining granular base within the pavement structure.

**Granular S** – A set of requirements for dense graded aggregates intended only for use as surface dressing of low-volume unpaved roads with an AADT less than 200.

**Reclaimed Concrete Material (RCM)** – A material that is removed or processed from old hydraulic cement concrete and which may also contain up to 30% recycled asphalt pavement as permitted by OPSS 1010.

**Reclaimed Asphalt Pavement (RAP)** – Processed hot mix asphalt material that is recovered by partial or full depth removal.

**Recycled Crushed Aggregate (RCA)** – Aggregate resulting from the processing of asphalt pavement and/or concrete reclaimed from old roads and/or structures.

**Select Subgrade Material (SSM)** – A set of requirements for well-graded non-plastic aggregates used to replace poor subgrade materials and as swamp backfill.

## 2.2 Sources of Raw Materials

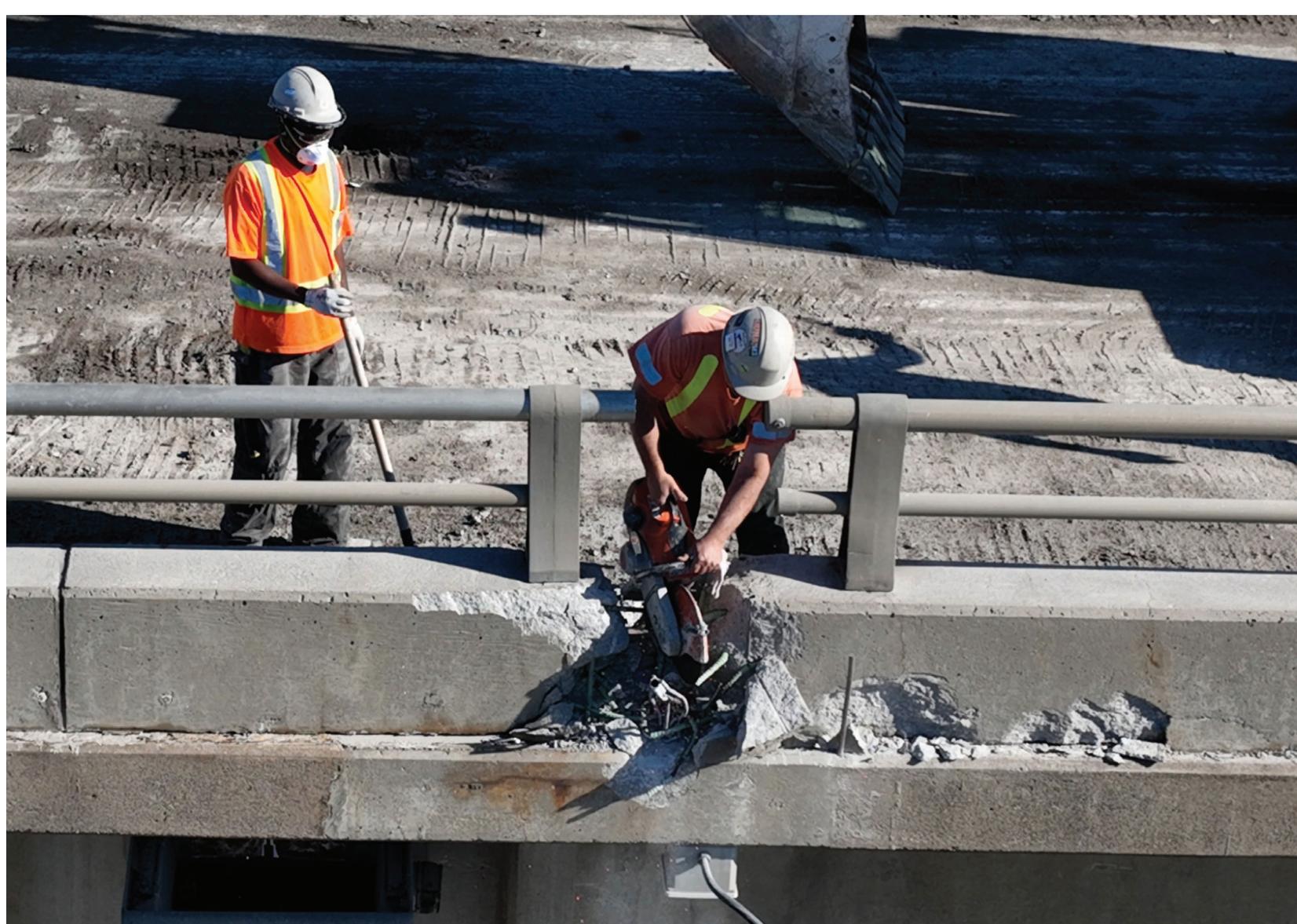
Recycled aggregate materials can be obtained from several primary sources, including:

**Asphalt Sources** – Existing asphalt from highways, roadways, and parking lot surfaces.

**Road Infrastructure Concrete Sources** – Existing concrete from sidewalks, curbs, pavements, or concrete structures.

**Reclaimed hydraulic cement concrete** – Such as existing bridges that contain concrete footings, foundation walls, and deck slabs.

**Unused, returned concrete cement and asphalt.**



## 2.3 Recycled Crushed Aggregate Final Products

Recyclable materials can then be used to produce products in the following categories:

- Aggregate base materials (Granular A, Granular B, etc.).
- Aggregate materials for concrete (U-fill, controlled low-strength material, etc.).
- Aggregate materials for asphalt (RAP).

19mm Crushed Concrete



50mm Crushed Concrete







### 3. Safety

Safety remains the most important aspect of any construction process, including recycled aggregate production. The raw material comes from existing asphalt from highways, roadways and parking lot surfaces and the concrete comes from existing concrete from sidewalks, curbs, pavements, and concrete structures, as well as buildings that contain concrete footings, foundation walls, and floor slabs.

This material is transported to secondary sites where it is then processed before being sent out as a re-engineered product to be used again in linear construction projects.

For this reason, it is important to note that many different safety exposure conditions exist in the product production process, from the demolition or material recovery process at the original construction site to the product unloading and processing stage, to the final product delivery at the new job site.

Since aggregate recycling equipment can be either located at permanent or temporary locations, additional safety challenges exist around the aggregate processing equipment. The Health and Safety Plan shall be followed by all persons at a recycled aggregate production facility. Minimum safety requirements include:

- ✓ Where required, visitors must report to the scale house for safety induction.
- ✓ All on-site personnel must wear appropriate personal protective equipment in accordance with the Ministry of Labour's requirements and any site-specific requirements.
- ✓ All drivers must report to the loader operator or scale house before dumping and must follow instructions at all times.
- ✓ Loaders should be equipped with a backup alarm and have the right-of-way in the yard.
- ✓ Extreme care should be taken around the vertical face of all stockpiles.

Visitors, drivers, and/or company employees who fail to comply with these requirements will be barred from accessing the facility and risk losing dumping privileges.

## 4. Receiving Recycled Raw Materials

Owners, contractors, or municipalities with construction materials suitable for producing recycled aggregates can contact any TARBA producer to determine if their materials are acceptable for recycling. The acceptance of these materials depends on:

- Reliability of demand.
- Current storage and processing space available at the site.
- Ability to produce a final product based on the raw material proposed.
- The quality of the raw material.
- History with the owner, contractor, or material hauler.

TARBA producers may request access to the site supplying the raw materials for recycling to inspect the materials prior to delivery to a production facility. Based on the results of the site inspection and/or discussions with the supplier, the producer may request additional testing of the raw materials before acceptance or may reject the materials.



## 4.1 Acceptance Conditions for Raw Recycled Materials

The first step in the aggregate recycling process is to perform an initial evaluation of the product to see if the product is suitable. Producers will accept concrete and asphalt that meet the following conditions:

- Material that is clean and meets the tolerances for small amounts of deleterious material such as wood, plastic, wallboard, gypsum drywall, plaster, bricks, tiles, clay-based materials, and organics as established by TARBA-Producer policies and can be screened to meet OPSS Specifications.
- Concrete containing reinforcing bars or wire mesh must be pre-approved and are subject to rejection.
- Reclaimed hydraulic cement concrete, such as existing bridges containing concrete footings, foundation walls, and deck slabs.

Companies that do not conform to these conditions may lose all dumping privileges, at the discretion of the TARBA producer.

## 4.2 Visual Inspection Upon Unload at Sites

Unloading shall only take place in the location indicated by the TARBA producer for the type of recycled material being received (asphalt and/or concrete).

TARBA producers visually inspect all loads prior to dumping them in their yards.

If, upon visual inspection of the material received, the representative determines that the supplied material does not conform to their raw material screening requirements, the material will be removed from the stockpile and reloaded back onto the truck.

## 4.3 Stockpile Contamination

Unacceptable material shall be removed from stockpiles as soon as it is identified.

## 4.4 Separation of Raw Materials

TARBA producers may separate the raw materials into three (3) piles:

- Asphalt only
- Concrete only
- Concrete and asphalt

## 5. Production and Quality Control

The final product conforms to the material requirements of OPSS 1010.

### 5.1 Facility Requirements

- Crushing units must meet Ministry of Labour standards for safety and have a valid Ministry of Environment operating permit (Environmental Compliance Approval or ECA), where required.
- Crushing operations shall comply with Ministry of Environment regulations and permit requirements for dust and noise suppression and other environmental mitigation measures as required.
- Producers utilize appropriate equipment to minimize segregation, such as radial or telescoping stackers using anti-segregation hoppers and paddles at the head pulleys. As well, keeping the drop height between the head pulley of the stacker and stockpile top to a minimum to control segregation and dust emissions.
- Equipment operators shall ensure consistent stockpiling of crushed finished products to eliminate potential sources of segregation.



## 5.2 Product Sampling Requirements

All production samples shall be obtained by trained personnel. The facility shall have a sampling plan based on industry best practices, designed to ensure products conform to the requisite OPSS specifications.

Sampling plans shall establish sample frequency, methodology, safety, equipment, and training. References for creating sampling plans may include but are not limited to:

- MTO LS-625
- ASTM D75-03 Standard Practice for Sampling Aggregates
- ASTM D3665 Standard Practice for Random Sampling of Construction Materials
- CSA A23.2-1A Attachment 1A, Sampling Aggregate from Stockpiles or Transportation Units
- Guidelines for Working Safely Around Stockpiles, March 2004, MASHA
- National Stone Association, Aggregate Handbook, Chapter 16, “Sampling and Testing Principles”

## 5.3 Aggregate Quality Control Requirements

The minimum test requirements for the various aggregate products shall meet OPSS 1010 Table 1, Physical Property Requirements and Table 2, Gradation Requirements.

When a TARBA producer supplies aggregate products to a local agency with different specifications, OPSS 1010 shall conform to the local requirements. Upon customer request, producers shall provide test results for the recycled materials purchased. These test results shall adhere to LS testing requirements for frequency.

## 5.4 Laboratory Certification Requirements

All aggregate laboratory testing conducted as part of the Quality Control production requirements shall be performed by a laboratory with appropriate certification from the Canadian Council of Independent Laboratories (CCIL) or an equivalent authority. Any additional testing required by the owner shall be conducted by accredited laboratories.

## **5.5 Additional Quality Control Testing Requirements**

TARBA producers shall utilize control charts to document the material performance of the products generated.

TARBA producer sites planning on supplying product to a local agency that has other test requirements, in addition to OPSS 1010, shall identify the minimum test frequency and acceptance limits for each additional test.

## **5.6 Retention of Quality Control Records**

TARBA producers shall maintain Quality Control test records for all products generated for a minimum of 3 years. Purchasers requesting confirmation of the ability of the product to conform to OPSS 1010 requirements shall be provided with the most recent copy of the Quality Control test results.

## **5.7 Loading and Weigh Out of Final Products**

The shipping face of a stockpile must be re-blended continuously during the loading operation. The load-out operation should take place across the base of the stockpile to ensure that the finished product is not segregated.

The loader operator will ensure the loader bucket is kept clean to avoid contamination of materials when loading trucks. The loader operator should not dig down into the floor of the stockpile or scrape the aggregate site floor before digging into the stockpile in such a manner that may cause material contamination.

## **5.8 Environmental Compliance**

TARBA producers will provide SDS sheets for all recycled aggregates and comply with all relevant provincial and federal environmental regulations.

Note: R.R.O., 1990, Reg. 347 under the Environmental Protection Act, exempts concrete (RCA) and asphalt (RAP) from EPA waste management approval requirements where the materials are to be re-used as construction material (e.g. recycled aggregates).



## 6. Owner Quality Assurance

Prior to the start-up of any project, the Owner is responsible for conducting their own testing at the point of production for assurance that the product is acceptable and meets their specifications. Owner quality assurance testing is recommended periodically throughout the production process. The Owner shall notify the TARBA producer of any tests that indicate non-conformity as soon as they are identified. Owner testing shall be done in conjunction with a TARBA producer's Quality Control personnel.





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