



City of Seattle

Gregory J. Nickels, Mayor

Seattle Department of Transportation

Grace Crunican, Director

MEMORANDUM

DATE: May 14, 2009

TO: Users of SDOT Pavement Opening and Restoration Rule 2004-02

FROM: Benjamin Hansen, SDOT Pavement Engineering and Management

SUBJECT: PORR Interpretative Memo
Aggregate Backfill Materials, Quality Assurance Testing
(SPU Water Department – Type 1 Mineral Aggregate)

Background

Section 4.1 of the 2004-02 of the SDOT Street and Sidewalk Pavement Opening and Restoration Director's Rule (PORR) makes Controlled Density Fill (CDF) the standard street backfill, but also includes a provision for the use of other materials:

... backfill must be appropriate for its intended use, and the prevailing soil and groundwater conditions, and must be capable of supporting pavement structure. Subsurface utilities may have special bedding or foundation needs. Backfill material that supports or might support pavement structure within the street right-of-way shall be controlled density fill (CDF), unless SDOT engineering staff authorize the use of a different backfill material. ***Use of materials other than CDF will require quality assurance testing by a SDOT approved, certified materials laboratory, to be paid for by the permittee ...***

CDF is a self-compacting, cementitious fill used in lieu of aggregate materials. CDF is favored because it develops load-bearing properties without compaction, reducing the potential for error in placement and the time required to complete (and inspect) the utility cut backfill process.

Although CDF is the standard, aggregate fills are used on a variety of City of Seattle projects. Properly selected and placed, they are strong and provide adequate pavement support -- Type 2 Mineral Aggregate is the standard base specified on all arterial pavements. However, these materials are sensitive to moisture, handling and compaction methods. To manage these variables, aggregate materials are normally placed with a materials laboratory's oversight.



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Conditions for Aggregate Backfill Use

Under the PORR, two basic conditions must be satisfied before an aggregate backfill is used. First, the material must be reviewed by City engineering staff to determine whether it is suitable for use in the proposed application. Second, the permittee must have in place a quality assurance program that demonstrates that the backfill material is consistently being compacted to standard. Materials tests on each cut may substitute for a quality assurance program.

Presently, staff have reviewed and approved only one alternate backfill material, Glacier NW / CalPortland 8565 Type 1 Mineral Aggregate from WSDOT Pit Number QS-CA-8. For inspector reference, a copy of the manufacturer's material data sheet is attached. The Glacier 8565 Type 1 is suitable as backfill and as a spot substitute for Type 2 Mineral Aggregate base course above 8565 fills. SPU Water Operations is currently using this material with quality control tests on each fill. Until a quality assurance plan is approved, this material must be tested in each cut. In all cases, the backfill shall be compacted and tested in accordance with Standard Specification Section 2-03.3(14), Method C. All materials tests are to be documented and provided to the SDOT Street Use Inspector.

Aggregate Backfill Quality Assurance (QA) Program Requirements

Quality assurance (QA) refers to a set of controls that ensure a process satisfies specified requirements in a systematic, reliable fashion. In the case of aggregate backfills, a quality control program will consist of approvals, tests, corrective actions and reports that demonstrate that backfills are consistently meeting specification. Permittees wishing to use aggregate backfills will need to complete the following steps:

1. Material Submittal and Approval. Permittees will be required to submit samples and a data sheet for the fill material they wish to use. The sample submittal may be waived if current materials data is on file. The submittal shall call out the application and any City of Seattle Standard Specifications relevant to its use. The material submittal will be reviewed by:

- SPU Materials Laboratory
- SDOT Street Maintenance, Pavement Engineering and Management Section

Written approval is required for each fill material, in each application.

2. QA Process Submittal and Approval. Quality assurance determines consistency of both the material and the construction process. The permittee shall prepare a submittal describing their QA process. The process submittal will be reviewed by:

- SPU Materials Laboratory
- SDOT Street Use Division
- SDOT Street Maintenance, Pavement Engineering and Management Section

Within the City of Seattle organization, the SPU Materials Laboratory has the expertise to determine whether a QA program provides sufficient materials control. The SDOT Street Use Division must determine whether the testing program is workable. Use of aggregate

materials may require additional inspection resources and training. Inspection procedures may be modified around the QA process. SDOT Street Maintenance assumes ownership and maintenance responsibility for the street. Written approval is required from each of these organizations.

The QA Process Submittal shall provide the following information:

- a. List of contacts with a description of roles and responsibilities.
- b. Specifications and manufacturer's data sheets for each material in the QA program.
- c. Description of the materials handling and construction process that will be used to meet the placement requirements in the current version of the City of Seattle's Standard Specifications and Standard Plans for Road, Bridge and Municipal Construction. Aggregates will be required to meet compaction standard of Standard Specification Section 2-03.3(14), Method C.
- d. Type and frequency of materials tests. The rate of testing on arterial and non-arterial streets must be specifically addressed. The qualifications of the materials laboratory shall be addressed with reference to Specification Section 1-06.5.
- e. Corrective action plan. When a failing test is reported, the cause of the failure shall be ascertained and documented, even if the specific test area is re-compacted. For each failed test, a plan of corrective action backward (e.g. recompact the previous lot) and forward (e.g. adjust moisture or compaction procedure) shall be implemented and reported. The corrective action plan must describe how the materials testing frequency will increase in response to tests below specification. The plan must outline authority of the Street Use inspector to call for additional tests and approve corrective action.
- f. Reporting plan. Quarterly reports will be required to keep stakeholders apprised of the results being achieved. Test information in the report shall be referenced by address and Street Use permit number. The initial QA Process Submittal shall include a sample report. Send copies of the [bi-monthly or quarterly] report to the QA process group: The SPU Materials Laboratory, SDOT Street Use and the SDOT Pavement Engineering and Management Section.

Use of aggregate backfills with spot verification will be permitted when the materials are approved and the QA process is in place.

Other

SDOT has the authority to suspend quality assurance testing and use of the aggregate material if test results indicate specifications are not reliably met or the reporting protocol is not followed.