APPENDIX VIII

PROTOCOL

FOR HANDLING

CONTAMINATED RAILROAD BALLASTS

DURING STREET RECONSTRUCTION PROJECTS

SECTION 10. SPECIAL TECHNICAL PROVISIONS

SECTION 10-1.01

PROTOCOL
FOR HANDLING
CONTAMINATED RAILROAD BALLASTS
DURING STREET RECONSTRUCTION PROJECTS

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Project Management Division
Bureau of Engineering
City of Los Angeles
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SAMPLING PROTOCOL

This is the standard sampling and analysis protocol for street reconstruction projects that have ballasts and/or rails in the right-of-way. This protocol is designed to assess the ballast and the underlying soil for heavy aliphatic hydrocarbon, California Title 22 metals and polychlorinated biphenyl contamination.

BACKGROUND

Ballast material for rail roads is present in various sections of the roadway in Los Angeles. Past experience tells us that these ballasts may be contaminated with hazardous materials. Of primary concern are heavy metals such as lead, which was used in the rail car bearings. Also of concern are polychlorinated biphenyls (PCBs) and heavy petroleum hydrocarbons such as grease. In many instances, lead compounds were used in the lubricating oils and greases used on the moving parts of the rail cars.

In several street reconstruction cases, it was found that TPH contamination (total petroleum hydrocarbon - heavy aliphatics) was confined to the ballast material. Testing of the ballast-soil interface indicates that the contamination has not significantly migrated into the soil beneath the ballast material.

The contamination is most likely confined to the ballast material because of the large pore space between the ballast granules and the viscous nature of the contamination (heavy aliphatic hydrocarbons).

OBJECTIVES

The following sampling and testing protocols are designed to do the following:

1. Determine if the ballast material is contaminated with heavy metals, heavy petroleum hydrocarbons and/or PCBs (contact Construction Division's Geotechnical Services Section to conduct the sampling).

2. If the ballast material is contaminated, determine if it has migrated downwards, towards the groundwater.

ONE SET OF RAILS

This protocol is used when there is one set of rails and/or one railroad ballast within the roadway.

Determine if the ballast material is contaminated by sampling the ballast material. In order to determine if contamination has migrated downwards, samples should be taken of the ballast-soil interface and intermittently (every fourth or fifth borehole) of the soil beneath the interface.

The length of street which contains the ballast will be divided into cells. Each cell will be approximately 300 feet in length. Samples will be taken between the rail ties and the rails in the middle of each cell. The distance between each sample will be approximately 300 feet, with the sample about 150 feet from the edge of the cell. Attachment A is an illustration of a street that has been sectioned into cells.

As an alternative, Geotechnical Services Section (GSS), Bureau of Engineering, may determine the sample locations based on the historical uses of specific areas within the project site (areas with a high likelihood of contamination will be sampled).

One sample per bore hole will be taken of the ballast material several inches beneath the pavement. Another sample will be taken of the ballast-soil interface. The soil beneath the ballast-soil interface of every fifth bore hole will be sampled at approximately five feet in depth in order assess whether contamination has migrated past the interface. See Attachment B.

The location of each bore hole will be described and plotted on a map of the project.

Samples will be taken using a Split Spoon Sampler with brass sleeves. The ends of the sleeves will be covered with aluminum foil and sealed with rubber end caps and tape. Each sealed sleeve will then be individually sealed in a plastic bag. All sealed and bagged samples will then be placed in a larger plastic bag. The samples will then be put on ice and transported to a laboratory for analysis. Proper chain-of-custody procedures will be used.

In order to prevent cross contamination between bore holes, the Split Spoon Sampler will be cleaned after each bore hole with a Tri-Sodium Phosphate solution followed by two rinsings with deionized water.

At the time samples are being taken, an Organic Vapor Analyzer (OVA) will be used to check if volatile organics are present.

The samples will be tested for heavy aliphatic hydrocarbons using EPA Method 418.1 or another Method as determined by GSS, California Title 22 metals using EPA Method 6010, and PCBs using EPA Method 8080. If the OVA detects volatile vapors at the time of sampling,

the samples will also be tested for volatile organics using an appropriate EPA Method, most likely 8015 or 8240. The samples may also be tested for other chemicals if deemed necessary.

Any samples that test over ten times the soluble threshold limit concentration (STLC) for a California Title 22 metal will be retested using the Waste Extraction Test (WET).

TWO SETS OF RAILS

This protocol will be used when there are two sets of rails and/or two railroad ballasts within the roadway. In this case, there would be a soil barrier between the two ballasts.

In order to determine if the ballast material is contaminated, samples of the ballast material will be analyzed. In order to determine if contamination has migrated downwards, samples will be taken of the ballast-soil interface and intermittently (every fourth or fifth borehole) of the soil beneath the interface.

The length of street which contains the ballast will be divided into cells approximately 600 feet in length. Since there are two separate ballasts, there will be two groups of cells that are parallel to each other. These cells will be staggered such that the centers of one group of cells coincide with the ends of the other group of cells. See Attachment C.

Samples will be taken from the middle of each cell. The distance between each sample in a group will be approximately 600 feet. Because the cells are staggered, the farthest sampling distance between cells in the two separate groups will be 300 feet. See Attachment C.

As an alternative, Geotechnical Services Section, Bureau of Engineering, may determine the sample locations based on the historical uses of specific areas within the project site (areas with a high likelihood of contamination will be sampled).

One sample per bore hole will be taken of the ballast material several inches beneath the pavement. Another sample will be taken of the ballast-soil interface. The soil beneath the ballast-soil interface of every fifth bore hole (the two groups of cells together) will be sampled at approximately five feet in depth in order asses whether contamination has migrated past the interface.

The location of each bore hole will be described and plotted on a map of the project.

Samples will be taken using a Split Spoon Sampler with brass sleeves. The ends of the sleeves will be covered with aluminum foil and sealed with rubber end caps and tape. Each sealed sleeve will then be individually sealed in a plastic bag. All sealed and bagged samples will then be placed in a larger plastic bag. The samples will then be put on ice and transported to a laboratory for analysis. Proper chain-of-custody procedures will be used.

In order to prevent cross contamination between bore holes, the Split Spoon Sampler will be cleaned after each bore hole with a Tri Sodium Phosphate solution followed by two rinsings with deionized water.

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Any sample that test over ten times the soluble threshold limit concentration (STLC) for a California Title 22 metal will be retested using the Waste Extraction Test (WET).

DISPOSAL OF BALLAST MATERIAL TAINTED WITH TOTAL PETROLEUM HYDROCARBONS

According to various conversations with persons in the State and County Department of Health Services[1], there is no regulatory limit or threshold that would classify TPH (total petroleum hydrocarbon) tainted soil as hazardous. For the purposes of disposal only however, the Regional Water Quality Control Board (RWQCB) classifies soil tainted with 900 parts per million or more of TPH as hazardous[2].

The following disposal procedures are to be used only for ballast material and/or soil contaminated with petroleum hydrocarbons. Other procedures can be added if approved by the RWQCB and/or the California Department of Health Services.

I. DISPOSAL PROCEDURE - ONE

This procedure should be used when time is critical and the ballast material must be removed as quickly as possible. If there is sufficient time to characterized the contamination, refer to Disposal Procedure - Two below.

1 The Leaking Underground Fuel Tank Manual will be referenced to determine the maximum allowable level (MAL) of TPH that can remain in the roadway. The MAL for diesel in the LUFT Manual will be used as the MAL for TPH.

2) Based on the initial sampling effort, if any cell(s) exceeds the MAL of the project site, the ballast material within the cell(s) will be removed. If the removed material is less than 900 ppm TPH (based on the initial sampling effort), it will be disposed of at a Class III landfill or as determined by the project manager.

3 If the initial sampling effort indicates that the removed ballast material exceeds the 900 ppm TPH criteria set by the RWQCB, the cell will be stockpiled on-site and covered. The stockpiled ballast material will then be resampled (discrete) in a random and representative manner and then analyzed for TPH using the same EPA method that detected the TPH in the initial testing. A minimum of four samples will be taken[3], otherwise the number of samples will be determined from the following schedule[4]:

TOTAL CUBIC YARDS OF STOCKPILED MATERIAL	# SAMPLES PER CUBIC YARDS OF MATERIAL	
1-10	1	3*
11-100	1	5-10*
101-1000	1	20-50*
>1000	1	50-100

A minimum of 4 samples are to be taken.

4) If all of the samples have TPH concentrations less than 900 ppm, the material will be disposed of as determined by the project manager or in a Class III disposal site. If any of the samples have a TPH concentration that exceeds 900 ppm, disposal of the material will require the approval of the RWQCB. The RWQCB will be requested to determine if the material can be disposed of in a Class III facility. If the RWQCB does not approve of Class III disposal, it will be disposed of in a Class I facility or in another approved manner.

Attachment D is a sample letter requesting approval for the Class III disposal of TPH contaminated ballast material (greater than 900 ppm TPH). Attachment E is a copy of the letter approving the Class III disposal of TPH tainted ballst material.

II. DISPOSAL PROCEDURE - TWO

This procedure should reduce the amount of ballast material that will be stockpiled on-site (900 ppm TPH or greater), and therefore the amount of material that may have to be disposed of in a Class I landfill. This is the preferred procedure if there is adequate time.

1 The MAL for TPH will be determined by referencing the LUFT Manual as explained in section I-1 above (Disposal Procedure - One).

2) Based on the MAL, determine which cells (of ballast material) must be removed.

3) Of the cells to be removed, identify the ones where the initial sampling showed TPH concentration greater than 900 ppm.

4) The limits of the cell(s) identified in II-3 above will be redefined in the following manner in order to determine the actual limits of contamination.

New samples will be taken within the identified cell(s) at varying distances from the initial sample location that showed contamination.

For example: samples will be taken from boreholes located 5 feet and 10 feet to the east and to the west of the initial sample location that showed contamination (a total of 4 boreholes).

The two closest new samples (to the initial sample location) will then be analyzed for TPH. If one or both of the new samples show concentrations below 900 ppm TPH, a new limit or boundary of contamination is established at this point.

If any of the two closest samples show TPH concentrations greater than 900 ppm, the next closest sample will be analyzed. This process will be continued until a new limit or boundary of contamination can be established - when the new samples show TPH concentrations less than 900 ppm.

5) The newly defined cell(s) will then be stockpiled on site, and resampled and analyzed as described in section I-3 above.

6) Disposal of the stockpiled material will be determined as described in section I-4 above.

The rest of the material that will have to be removed from the project site (but not stockpiled) will be disposed of in a class III landfill or as determined by the project manager.

FOOTNOTES

1. Cindy Oshita, California Department of Health Services (CDHS) - Alternative Technology, Sacramento

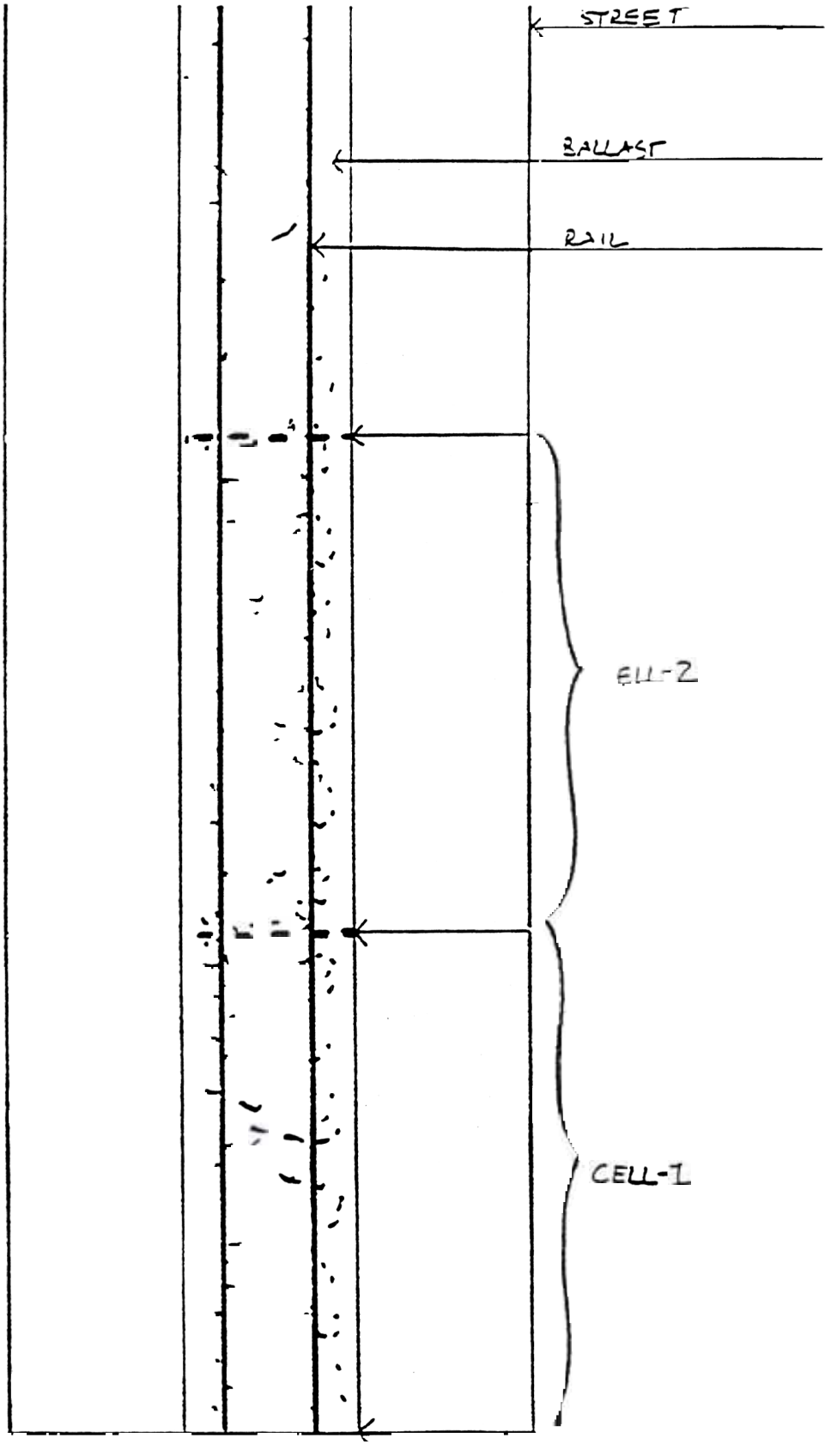
   Tom Klinger, Los Angeles County Department of Health Services (LACDHS), Los Angeles

2. Rod Nelson, California Regional Water Quality Control Board (RWQCB), Los Angeles Region

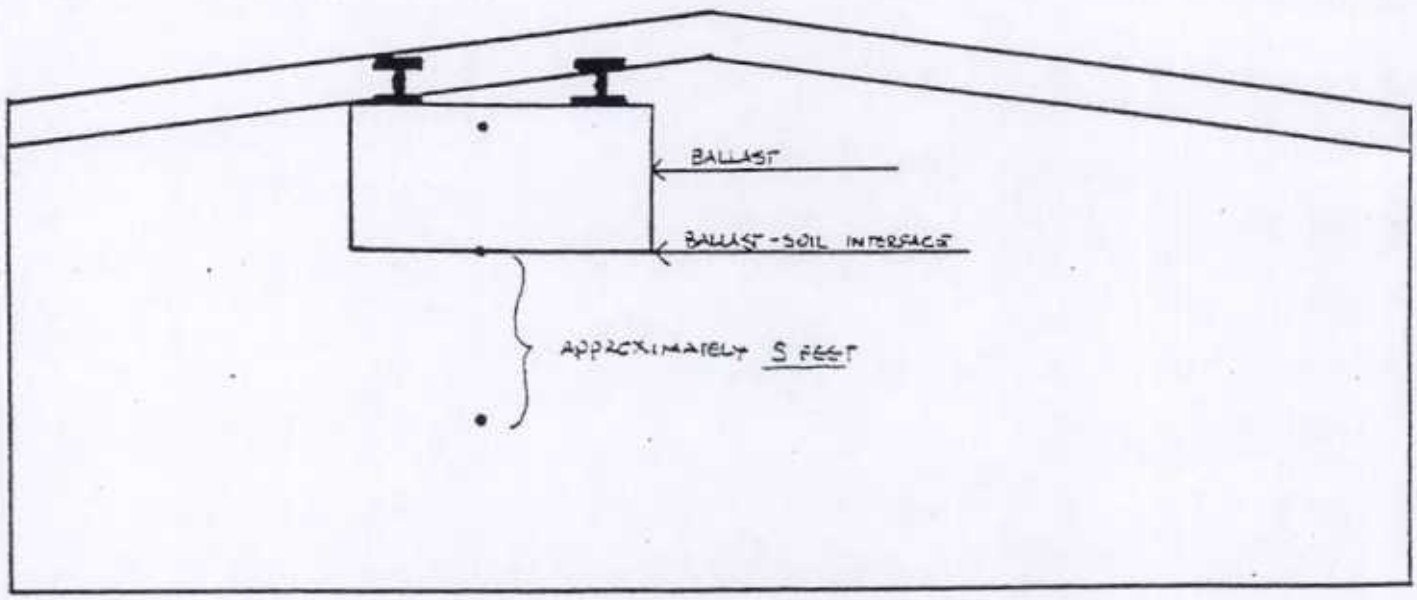
3. Hank Yacoub, RWQCB, Los Angeles Region

4. John Lewis, RWQCB - Technical Support Group, Los Angeles Region

LU-B:PRCD-3.RR

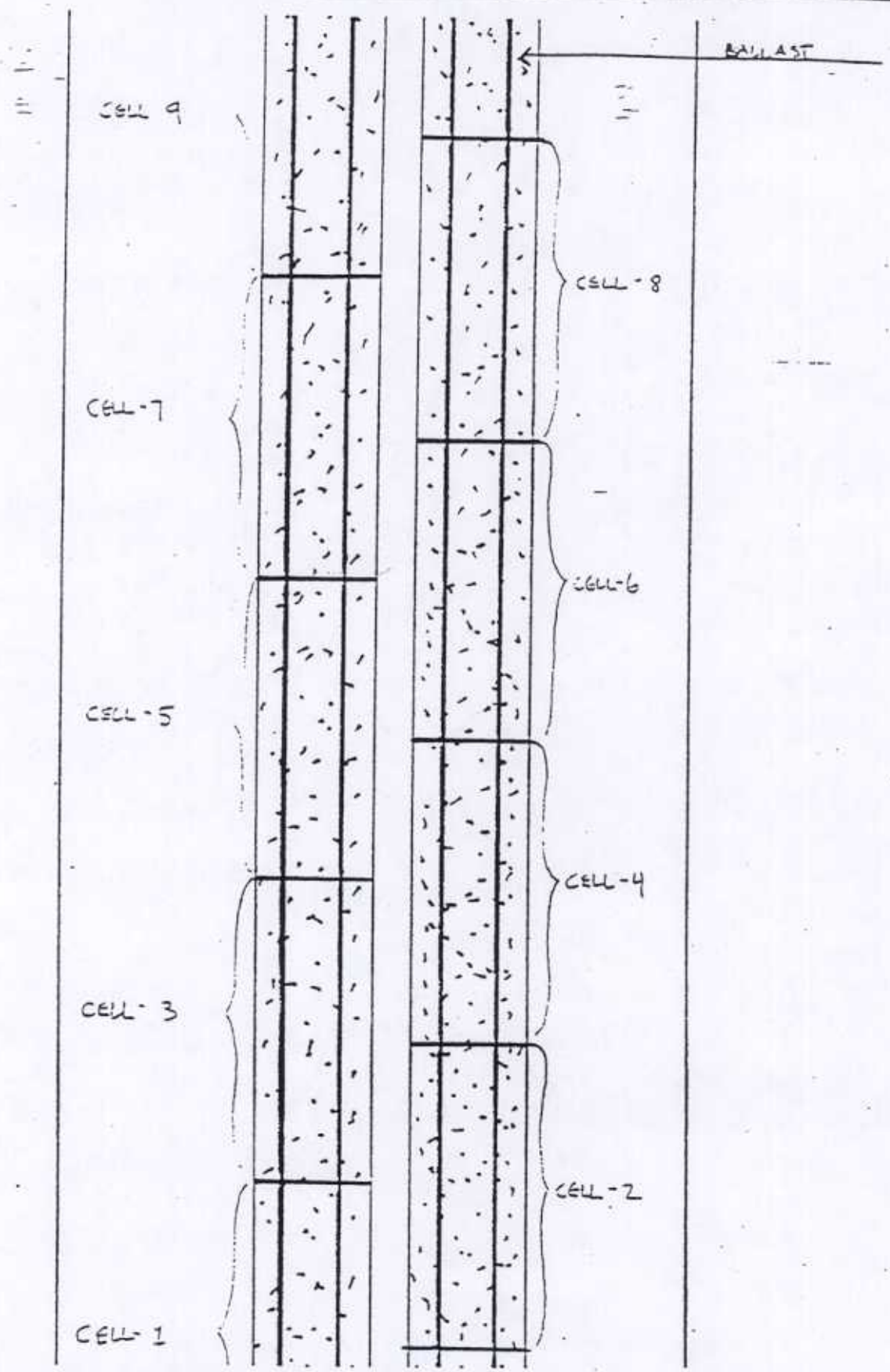


ATTACHMENT A CELL ON SET OF RAILS TOP VIEW



• – Sample Location

ATTACHMENT B Street Cross Section



ATTACHMENT C Cells – Two Sets of Rails