3.3.3 Gravel Drainage Media Placement

In addition to the CQA procedures described in Sections 02240 of the Technical Specifications document, the CQA Monitor will:

- Sample stockpile and test for hydraulic conductivity and verify that requirements (Table 3-1) are met
- Verify removal and stockpiling of large or sharp rocks material (if applicable).
- Verify that source of material is suitable for Gravel Drainage Media.
- Sample and perform classification testing at required frequencies.
- Verify that final grading meets tolerance requirements.
- Verify that final grades meet slope requirements.
- Check for areas where additional fill needs to be placed due to settlement.
- Verify that final lines and grades of the regraded area are correct.
- Verify Liner proper placement before placing gravel.

3.3.4 Liner Anchor Trenching

As described in the Technical Specifications document, the CQA Monitor will:

- Verify depth and other dimensions
- Verify slope requirements
- Verify Liner placement
- Verify that backfill is being placed in accordance with the Construction Specifications
- Check proper backfill compaction placement where applicable
- Verify that final grades are consistent with the construction drawings by reviewing as-built surveys with the Design Engineer

3.3.5 Protective Soil Cover

As described in the "protective soil cover" in the Technical Specifications document and in this CQA Plan (see Table 3-1 below), the CQA Monitor will:

- Sample stockpile and test for hydraulic conductivity and verify that requirements (Table 3-1) are met
- Verify removal and stockpiling of large or sharp rocks material (if applicable)
- Monitor placement of material, and mark damage to the project components during material installation, and verify that damage is repaired

- Verify that the underlying geotextile on gravel drainage media is installed correctly prior to placement of protective soil layer
- Verify that layer thickness control is established
- Verify that final grading meets slope requirements
- Verify that in-place compaction and moisture meet requirements (Table 3-1)

Table 3-1
STAGE III-B – Earthwork CQA Testing

Test	Standard Designation	Minimum Test Frequency	Unit	Requirement	Material
Liner Base, Protective Soil Cover; Project Specifications Division 2					
Visual Classification	ASTM D2488	1 per material source and 1/2,000 cy	NA	Classified as silty sand, clayey sand, silts, or lean clay	Liner base fill, Protective soil cover
Gradation	ASTM D422 ASTM D1140	1 per material source and 1/5,000 cy	% passing by weight	90-100% passing 3" sieve; 50-100% passing No. 4 sieve; 0-30% passing No. 200 sieve.	Liner base fill
	ASTM C136	1 per material source	% passing by weight	97-100% passing 1" sieve; 0-5% passing No. 4 sieve	Crushed Rock Drainage layer
	ASTM D422	1 per material source and 1/20,000 cy		On side slope:100% passing 1" sieve; on floor: 100% passing 3" sieve; 50-100% passing No. 4 sieve; 0-30% passing No. 200 sieve.	Protective soil cover

Test	Standard Designation	Minimum Test Frequency	Unit	Requirement	Material
Liquid Limit	ASTM D4318	1 per material source and 1/5,000 cy	% moisture by weight	For project records	Liner base fill
Plasticity Index	ASTM D4318	1 per material source and 1/5,000 cy	% moisture by weight	For project records	Liner base fill
Moisture Density Curve (Modified Proctor)	ASTM D1557	1 per material source and change in PI ± 5	NA	Obtain maximum dry density (MDD) and optimum moisture content (OMC)	Liner base fill, Protective soil cover
In-place Density and Moisture Content	ASTM D2922 ASTM D3017	1/1,000 cy	% of MDD % moisture	95% of MDD **min.** 0% to 5 % above OMC 90% of MDD **max.** OMC or below	Liner base fill Protective soil cover
In-place Density Verification	ASTM D1556	1 per 50 nuclear density tests	pcf	Within 5 pcf of each other	Liner Base fill, Protective soil cover
Laboratory Hydraulic Conductivity Tests	ASTM D5084 ASTM D5084 ASTM D2434	1 per 5,000 cy (sample in place) 1 per 10,000 cy, minimum 3 tests 1 per 5,000 cy, minimum 3 tests	cm/sec	For project records 1x10-5 cm/sec **min.** at 90% of MDD and at OMC. Use in weighted average calculation. Use in weighted average calculation[1]	Liner base fill Protective soil cover LCRS drainage media

Test	Standard Designation	Minimum Test Frequency	Unit	Requirement	Material
Field (BAT) Hydraulic Conductivity Tests	Two- Stage Borehole Test – ASTM D6391	1 per 10,000 cy	cm/sec	For project records	Liner base fill
Thin Wall Sampling Method	Sampling – ASTM D1587 Testing – ASTM D5084 (confining pressure of 250 psf)	Minimum of 1 test	cm/sec	For project records	Liner base fill

[1] A weighted average calculation based on area will be used to determine the effective permeability of the protective soil cover on the base of the landfill. The formula is as follows:

Weighted Average = [(A1 x P1) + (A2 x P2)] / (A1 + A2)

where:

A1 = area of the protective soil layer

P1 = average permeability of the protective soil layer (from laboratory tests)

A2 = area of LCRS drainage media (area of the drainage media that projects through the 2-foot-thick protective soil layer)

P2 = average permeability of the LCRS drainage media (from laboratory tests)

The minimum acceptable value for the weighted average is 1x10-4 cm/sec.

Grove, Amy@Waterboards

From: Yamamoto, Len <Len.Yamamoto@cbi.com>
Sent: Thursday, April 25, 2013 1:23 PM
To: Grove, Amy@Waterboards
Cc: Odermatt, John@Waterboards; Mohr, Neil; Gardner, Tom
Subject: RE: Tentative Addendum 2 to Order 99-74: Sycamore Landfill Expansion
Attachments: Revised Pages Sycamore Stage III-B CQA Plan 2013 Rev 1 4-24-2013.pdf

Amy,
Thank you for your review. We don't believe that the addendum needs further revisions than what we had proposed earlier. The number of samples, sampling method, and calculation method can be defined in the CQA Plan. Proposed revised pages to the CQA Plan are attached. The number of samples, where the samples are obtained, testing methods, and the calculation method are defined along with the pass/fail criteria.

The following is provided to specifically answer the items raised in your email:

1. Proposed number of samples for permeability testing:

PCS – 1 per 10,000 CY of stockpiled material but no less than 3 for any individual cell construction (for Stage III-B, this would be 3 samples)

LCRS drainage media – 1 per 5,000 CY of material to be placed but no less than 3 for any individual cell construction (for Stage III-B, this would be 3 samples)

2. Samples will be obtained from stockpiled materials to be used for the construction

3. The weighted average calculation based on area will be made as follows:

Weighted Average = [(A1 x P1) + (A2 x P2)] / (A1 + A2)

where:

A1 = area of the PCS

P1 = average permeability of the PCS (from laboratory tests)

A2 = area of LCRS drainage media (area of the drainage media that will project through the 2-foot-thick PCS)

P2 = average permeability of the LCRS drainage media (from laboratory tests)

For example, assume the following:

A1 = 150,000 sf

P1 = 3 x 10-5 cm/sec

A2 = 5,000 sf

P2 = 1 x10-2 cm/sec

For this example, [(150,000 x 3x10-5) + (5,000 x 1x10-2)] / (150,000 + 5,000) = 3.5 x 10-4 cm/sec

So for this example, it would meet the requirement of a minimum 1 x 10-4 cm/sec.

Please let us know if you have any questions.

Len Yamamoto, PE
Project Manager
Environmental & Infrastructure
Tel: +1 619 533 7322
Cell: +1 619 322 8951
Fax: +1 619 239 1238
len.yamamoto@CBI.com

CB&I
1230 Columbia Street, Suite 1200
San Diego, CA 92101
USA
www.CBI.com

From: Mohr, Neil [mailto:NMohr@republicservices.com]
Sent: Wednesday, April 24, 2013 10:06 AM
To: Grove, Amy@Waterboards
Cc: Odermatt, John@Waterboards; Yamamoto, Len
Subject: RE: Tentative Addendum 2 to Order 99-74: Sycamore Landfill Expansion

Thanks Amy,
We have spoken with Len and he is putting together the procedures that can be added to the CQA document. We should have that information over in a day or two. Thanks for your review and we will be forwarding the info soon.

Neil R Mohr
General Manager | Republic Services
619.449.9026 office | 619.733.7525 cell | 619.449.1050 fax
Sycamore Landfill Office | 8514 Mast Boulevard | Santee, CA 92071

From: Grove, Amy@Waterboards [mailto:Amy.Grove@waterboards.ca.gov]
Sent: Tuesday, April 23, 2013 10:12 AM
To: Mohr, Neil; Odermatt, John@Waterboards; Gardner, Tom
Cc: Len.yamamoto@shawgrp.com; Mr. Bill Prinz
Subject: RE: Tentative Addendum 2 to Order 99-74: Sycamore Landfill Expansion

Neil,
John and I have been reviewing your comments and proposed modifications to the tentative addendum. We were hoping to get clarification for comment No. 3 pertaining to the PCS requirements for the liner system. For example, the comment proposes to calculate a weighted average, but does not indicate the proposed number of samples this calculation would be based on, how the samples used in the calculations were taken, or how the calculations themselves would be made. We would appreciate it if you could provide us with this information as soon as possible. We have to have our agenda package ready to go to review by May 1st, so we need time to evaluate your response and decide what, if any, changes should be made to the tentative addendum.
Thank you.
Amy

From: Mohr, Neil [mailto:NMohr@republicservices.com]
Sent: Tuesday, April 16, 2013 1:49 PM
To: Odermatt, John@Waterboards; Gardner, Tom

Cc: Grove, Amy@Waterboards; Len.yamamoto@shawgrp.com; Mr. Bill Prinz
Subject: RE: Tentative Addendum 2 to Order 99-74: Sycamore Landfill Expansion

(Oops, this one contains the memo)
John,
Thanks for you and your staffs efforts on the Tentative Addendum 2 to Order 99-74 for Sycamore Landfill. As you know we are prepared to begin work on the Stage's liner system. We have attached a memo with our requested clarifications/changes to the Order. If you or Amy have any questions, please call Len Yamamoto at 619/533-7322 or me at 619/733-7525.

Neil R Mohr
General Manager | Republic Services
619.449.9026 office | 619.733.7525 cell | 619.449.1050 fax
Sycamore Landfill Office | 8514 Mast Boulevard | Santee, CA 92071

From: Odermatt, John@Waterboards [mailto:John.Odermatt@waterboards.ca.gov]
Sent: Monday, April 08, 2013 11:17 AM
To: Gardner, Tom
Cc: Grove, Amy@Waterboards; Len.yamamoto@shawgrp.com; Mohr, Neil; Mr. Bill Prinz
Subject: Tentative Addendum 2 to Order 99-74: Sycamore Landfill Expansion

Tom,
Attached is a pdf with the tentative Addendum No. 2 to Order 99-74 for Sycamore Landfill. This addendum, if adopted, would prescribe requirements for the expansion of Sycamore Landfill by including construction of Stage III-A. As indicated in the cover letter/notice, written comments on the tentative Addendum are due to the San Diego Water Board by May 8, 2013, and we anticipate scheduling this item for consideration by our Board members at their monthly meeting on June 19, 2013.

Unless we have a reason to schedule a hearing, we are hoping to put this item on the Consent Calendar for consideration by our Board members. Please contact Ms. Amy Grove (agrove@waterboards.ca.gov or TEL: 858-637-7136) if you have any questions. John

Regards,

John R. Odermatt, M.Sc., PG
Senior Engineering Geologist
Cleanup and Land Discharge Branch
California Regional Water Quality Control Board - San Diego Region
9174 Sky Park Court, Suite 100
San Diego, CA 92123
TEL: 858-637-5595
FAX: 858-571-6972

RWQCB WEB PAGE:
Web: www.waterboards.ca.gov/sandiego

CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY
SAN DIEGO REGIONAL WATER QUALITY CONTROL BOARD

Grove, Amy@Waterboards

From: Yamamoto, Len <Len.Yamamoto@cbi.com>
Sent: Tuesday, May 07, 2013 4:19 PM
To: Grove, Amy@Waterboards
Cc: Odermatt, John@Waterboards; Mohr, Neil; Gardner, Tom
Subject: RE: Tentative Addendum 2 to Order 99-74: Sycamore Landfill Expansion

Amy,

Permeability test results of the yellow fill material ranged from 1.2 x 10-5 to 1.2 x 10-4 cm/sec. Samples were compacted to 90% of max dry density per ASTM D1557 at optimum moisture content.
There were 5 tests. The laboratory test results were included in Appendix F of the January 2013 **Design Report for Stage III-B Liner**.
The results were:

1.2 x 10-5
1.5 x 10-5
6.8 x 10-5
7.6 x 10-5
1.2 x 10-4

Please let me know if there is anything else you need.

Len Yamamoto, PE
Project Manager
Environmental & Infrastructure
Tel: +1 619 533 7322
Cell: +1 619 322 8951
Fax: +1 619 239 1238
len.yamamoto@CBI.com

CB&I
1230 Columbia Street, Suite 1200
San Diego, CA 92101
USA
www.CBI.com

From: Grove, Amy@Waterboards [mailto:Amy.Grove@waterboards.ca.gov]
Sent: Tuesday, May 07, 2013 3:49 PM
To: Yamamoto, Len
Cc: Odermatt, John@Waterboards; Mohr, Neil; Gardner, Tom
Subject: RE: Tentative Addendum 2 to Order 99-74: Sycamore Landfill Expansion

Len,
I am working on our response to comments and I think it would be helpful if you could give me a range of permeabilities for the yellow fill material based on samples already collected and analyzed for use at the site. It would help me to better gauge what we might expect to see if samples collected for Stage III-B and future expansion areas at the site. So, if you could provide the range and the number of samples it is based on, that would be very helpful. Thank you!
Amy

From: Yamamoto, Len [mailto:Len.Yamamoto@cbi.com]
Sent: Thursday, April 25, 2013 1:23 PM
To: Grove, Amy@Waterboards
Cc: Odermatt, John@Waterboards; Mohr, Neil; Gardner, Tom
Subject: RE: Tentative Addendum 2 to Order 99-74: Sycamore Landfill Expansion

Amy,
Thank you for your review. We don't believe that the addendum needs further revisions than what we had proposed earlier. The number of samples, sampling method, and calculation method can be defined in the CQA Plan. Proposed revised pages to the CQA Plan are attached. The number of samples, where the samples are obtained, testing methods, and the calculation method are defined along with the pass/fail criteria.

The following is provided to specifically answer the items raised in your email:

1. Proposed number of samples for permeability testing:
PCS – 1 per 10,000 CY of stockpiled material but no less than 3 for any individual cell construction (for Stage III-B, this would be 3 samples)
LCRS drainage media – 1 per 5,000 CY of material to be placed but no less than 3 for any individual cell construction (for Stage III-B, this would be 3 samples)

2. Samples will be obtained from stockpiled materials to be used for the construction

3. The weighted average calculation based on area will be made as follows:

Weighted Average = [(A1 x P1) + (A2 x P2)] / (A1 + A2)

where:

A1 = area of the PCS

P1 = average permeability of the PCS (from laboratory tests)

A2 = area of LCRS drainage media (area of the drainage media that will project through the 2-foot-thick PCS)

P2 = average permeability of the LCRS drainage media (from laboratory tests)

For example, assume the following:

A1 = 150,000 sf

P1 = 3 x 10-5 cm/sec

A2 = 5,000 sf

P2 = 1 x10-2 cm/sec

For this example, [(150,000 x 3x10-5) + (5,000 x 1x10-2)] / (150,000 + 5,000) = 3.5 x 10-4 cm/sec

So for this example, it would meet the requirement of a minimum 1 x 10-4 cm/sec.

Please let us know if you have any questions.

Len Yamamoto, PE
Project Manager
Environmental & Infrastructure
Tel: +1 619 533 7322
Cell: +1 619 322 8951
Fax: +1 619 239 1238
len.yamamoto@CBI.com

CB&I
1230 Columbia Street, Suite 1200
San Diego, CA 92101
USA
www.CBI.com

From: Mohr, Neil [mailto:NMohr@republicservices.com]
Sent: Wednesday, April 24, 2013 10:06 AM
To: Grove, Amy@Waterboards
Cc: Odermatt, John@Waterboards; Yamamoto, Len
Subject: RE: Tentative Addendum 2 to Order 99-74: Sycamore Landfill Expansion

Thanks Amy,
We have spoken with Len and he is putting together the procedures that can be added to the CQA document. We should have that information over in a day or two. Thanks for your review and we will be forwarding the info soon.

Neil R Mohr
General Manager | Republic Services
619.449.9026 office | 619.733.7525 cell | 619.449.1050 fax
Sycamore Landfill Office | 8514 Mast Boulevard | Santee, CA 92071

From: Grove, Amy@Waterboards [mailto:Amy.Grove@waterboards.ca.gov]
Sent: Tuesday, April 23, 2013 10:12 AM
To: Mohr, Neil; Odermatt, John@Waterboards; Gardner, Tom
Cc: Len.yamamoto@shawgrp.com; Mr. Bill Prinz
Subject: RE: Tentative Addendum 2 to Order 99-74: Sycamore Landfill Expansion

Neil,
John and I have been reviewing your comments and proposed modifications to the tentative addendum. We were hoping to get clarification for comment No. 3 pertaining to the PCS requirements for the liner system. For example, the comment proposes to calculate a weighted average, but does not indicate the proposed number of samples this calculation would be based on, how the samples used in the calculations were taken, or how the calculations themselves would be made. We would appreciate it if you could provide us with this information as soon as possible. We have to have our agenda package ready to go to review by May 1st, so we need time to evaluate your response and decide what, if any, changes should be made to the tentative addendum.
Thank you.
Amy

From: Mohr, Neil [mailto:NMohr@republicservices.com]
Sent: Tuesday, April 16, 2013 1:49 PM
To: Odermatt, John@Waterboards; Gardner, Tom
Cc: Grove, Amy@Waterboards; Len.yamamoto@shawgrp.com; Mr. Bill Prinz
Subject: RE: Tentative Addendum 2 to Order 99-74: Sycamore Landfill Expansion

(Oops, this one contains the memo)
John,

Thanks for you and your staffs efforts on the Tentative Addendum 2 to Order 99-74 for Sycamore Landfill. As you know we are prepared to begin work on the Stage's liner system. We have attached a memo with our requested clarifications/changes to the Order. If you or Amy have any questions, please call Len Yamamoto at 619/533-7322 or me at 619/733-7525.

Neil R Mohr
General Manager | Republic Services
619.449.9026 office | 619.733.7525 cell | 619.449.1050 fax
Sycamore Landfill Office | 8514 Mast Boulevard | Santee, CA 92071

From: Odermatt, John@Waterboards [mailto:John.Odermatt@waterboards.ca.gov]
Sent: Monday, April 08, 2013 11:17 AM
To: Gardner, Tom
Cc: Grove, Amy@Waterboards; Len.yamamoto@shawgrp.com; Mohr, Neil; Mr. Bill Prinz
Subject: Tentative Addendum 2 to Order 99-74: Sycamore Landfill Expansion

Tom,
Attached is a pdf with the tentative Addendum No. 2 to Order 99-74 for Sycamore Landfill. This addendum, if adopted, would prescribe requirements for the expansion of Sycamore Landfill by including construction of Stage III-A. As indicated in the cover letter/notice, written comments on the tentative Addendum are due to the San Diego Water Board by May 8, 2013, and we anticipate scheduling this item for consideration by our Board members at their monthly meeting on June 19, 2013.

Unless we have a reason to schedule a hearing, we are hoping to put this item on the Consent Calendar for consideration by our Board members. Please contact Ms. Amy Grove (agrove@waterboards.ca.gov or TEL: 858-637-7136) if you have any questions. John

Regards,

John R. Odermatt, M.Sc., PG
Senior Engineering Geologist
Cleanup and Land Discharge Branch
California Regional Water Quality Control Board - San Diego Region
9174 Sky Park Court, Suite 100
San Diego, CA 92123
TEL: 858-637-5595
FAX: 858-571-6972

RWQCB WEB PAGE:
Web: www.waterboards.ca.gov/sandiego

CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY
SAN DIEGO REGIONAL WATER QUALITY CONTROL BOARD

recipient, please contact the sender by reply e-mail and delete all copies of this e-mail; further, you are notified that disclosing, copying, distributing or taking any action in reliance on the contents of this information is strictly prohibited.