COMMONWEALTH of VIRGINIA

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September 18, 2019

Mr. Michael Liberati
Corteva Environmental Remediation
974 Centre Road, Building 735
Wilmington, DE 19805

VIA ELECTRONIC MAIL

Re: 2019 Leaf-on Maintenance Inspection Reports for Allied Ready Mix, City Shops and Constitution Park BMAs
Former DuPont Waynesboro Site, Area of Concern 4
Waynesboro, Virginia
EPA ID# VAD003114832

Dear Mr. Liberati:

This letter acknowledges the receipt and review of the 2019 Leaf-on Maintenance Inspection Reports (Report) dated August 19, 2019, submitted to the Virginia Department of Environmental Quality, Office of Remediation Programs (VDEQ) by AECOM on behalf of the E.I DuPont de Nemours and Company (DuPont).

The Department has no further comments and accepts the submittal as complete.

If you have any questions, you may contact me at 540-574-7802 or by email at William.jordan@deq.virginia.gov.

Sincerely,

W. Calvin Jordan
Corrective Action Project Manager
Office of Remediation Programs

cc: DuPont Waynesboro Correspondence File
Joel Hennessey, US EPA
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Memorandum

To	Michael Liberati, Corteva Environmental Remediation Nancy Grosso, Corteva Environmental Remediation	Page 1 of 3
CC	Cameron Dixon, AECOM Kristy Hoffman, AECOM	
Subject	Constitution Park BMA - 2019 Leaf-on Maintenance Inspection Former DuPont Waynesboro Site, Area of Concern 4	
From	Andrew Miano, AECOM Joshua Collins, AECOM	
Date	August 19, 2019	

This memorandum summarizes the 2019 Leaf-on Maintenance Inspection (inspection) of the Constitution Park Bank Management Area (BMA) conducted on June 13th, 2019. Inspection activities were conducted in compliance with the scope described in the Maintenance Plan included as Appendix M of the Basis of Design Report, Phase 1A BMAs, South River AOC 4 (Anchor QEA et al., 2016). The purpose of the maintenance inspection is to identify potential BMA maintenance needs, focusing on vegetative development, bank stability, and the integrity of the installed bank remediation features. This inspection also focused on performance of the repair work completed in the spring of 2019 including newly installed coir logs, erosion control fabric, and live stakes (AECOM, 2019a). Additionally, hydroseed was applied to the bank to increase vegetative coverage and stabilize exposed soil on the bank slope. Additional attachments to this memorandum include:

- Table 1 – Maintenance inspection log
- Appendix A - Photographic log
- Appendix B - Waynesboro Off-Site Cap Areas Inspection Record Sheet

Findings

The results of the maintenance inspection found stable bank conditions present throughout the BMA and the small areas of localized torn erosion control fabric, exposed geocell, and minor erosion noted in the leaf-off 2018 inspection memo were successfully repaired (AECOM, 2019a; 2019b). A brief summary of findings is provided below; complete details of the maintenance inspection are included in Table 1 and in the photographic log (Appendix A).

Vegetation

- Robust growth of planted native vegetation was noted throughout the BMA. Coverage by native plants has increased compared to previous inspections, both due to naturally occurring recruitment and the repair activities (including hydroseeding, 2” plug plantings, and installed live stakes) conducted earlier this year.
- Targeted invasive species management activities (i.e. herbicide applications) have reduced the coverage of Japanese knotweed (*Fallopia japonica*) at the BMA; however, small localized patches continue to remain.
- Newly installed live stake establishment has been variable (between 20 and 50% established). As the repair work was completed in May 2019, shortly before this maintenance inspection, further monitoring during the leaf-off period of 2019 will determine if more live stakes will become established overtime.

- The success of the hydroseed application was also variable. Although the overall vegetation coverage increased post application, there are still areas where vegetative coverage is below 50%. Native vegetative coverage will continue to be monitored during the leaf-off period of 2019.
- Newly planted 2” plugs remain healthy and have contributed to increase native vegetation cover and diversity.

Stability

- River bank angles remained generally unchanged and maintain a consistent bank angle throughout the BMA as constructed (Table 1).
- At monitoring stations 00 – 25’ and 00 + 00’ the toe of slope shows signs of heavy pedestrian foot traffic along the bottom of the bank, near newly installed live stakes.
- There was no evidence of “at-risk” trees (e.g. trees that may no longer be stable due to erosion).
- Small areas of erosion noted in the 2018 leaf-off inspection memo were successfully repaired with coir logs and erosion control fabric. Some exposed geocell and localized scour is still present below the newly installed coir logs (00 + 250’) and around the base of trees (00 + 400’).

Installed Features

- Rock toe features were intact, with increased sediment deposition filling in the interstices.
- Large woody debris was stable, and anchor chains were intact.
- Coir logs were intact, but several areas of wear associated with foot traffic were noted along the toe of the slope.
- Both newly installed erosion control fabric and coir logs were intact.
- Installed geocell was intact, and the majority of exposed geocell noted in the 2018 leaf-off inspection memo was backfilled and repaired.
- A newly installed gravel access path is being utilized by the public but is showing signs of wear, including exposed geocell underneath.
- Groundhog activity along the BMA has increased with two burrows, one near the pedestrian steps, and one near 00 + 150’. Future monitoring efforts will continue to monitor groundhog activity to determine if corrective actions are necessary.

The 2019 leaf-on maintenance inspection conducted at the Constitution Park BMA confirmed the integrity of the installed bank stabilization, and the success of the repair work completed in 2019 (AECOM, 2019a). Native vegetation coverage is increasing along the BMA relative to coverage by Japanese knotweed due to an effective invasive vegetation management program that will continue throughout 2019. Vegetative growth will continue to be evaluated during the 2019 leaf-off maintenance inspection.

PATH FORWARD

The following maintenance activities are planned for the stabilized Constitution Park BMA based on the findings of the 2019 leaf-on inspection:

- Invasive species management (e.g. herbicide treatment) will continue in 2019.

REFERENCES

AECOM. 2019a. Constitution Park and Allied Ready Mix Bank Management Area Post-Construction Bank Repair Memorandum, Former DuPont Waynesboro Site Area of Concern 4. May 2019

AECOM. 2019b. 2018/2019 Constitution Park BMA - Leaf-off Maintenance Inspection Memorandum. Former DuPont Waynesboro Site, Area of Concern 4. March 2019.

Anchor QEA, AECOM, and E.I. du Pont de Nemours and Company. 2016. Basis of Design Report, Phase 1A Bank Management Areas, South River Area of Concern 4. September 2016.

Table 1
2019 Leaf-on Maintenance Inspection Log
Constution Park BMA
Former DuPont Waynesboro Site, Area of Concern 4

	Undercutting				Exposed Roots			At Risk Trees			Installed Stabilization Features Intact					Local Scour			
Station (ft)[1]	Approximate Bank Angle (Degrees)	Consistent Grade (Y/N)[2]	Notes	Photo # (Appendix A)	Exposed Roots (L/M/H)[3]	Notes	Photo # (Appendix A)	At Risk Trees Present (Y/N)[4]	Notes	Photo # (Appendix A)	Rock Toe/LWD (Y/N)[5]	Geocell (Y/N)[6]	Erosion Control Fabric (Y/N)[6]	Notes	Photo # (Appendix A)	Scour Present (Y/N)[7]	Notes	Photo # (Appendix A)	Overall Change Since Previous Inspection (Y/N)
00 - 25	30	N (see notes)	Lower bank; ~20 degrees Upper bank; ~55 degrees	1	L	No woody plants adjacent to edge of water	1	Y	No trees adjacent to edge of water	1	NA	NA	NA		1	Y	Low presence of scour 5' upstream of 00 - 25	1	N
00 + 00	40	N (see notes)	Lower bank; ~30 degrees Upper bank; ~55 degrees	2	NA	Minimal vegetation present on bank; Live stakes 50% established.	2	N	No trees adjacent to edge of water	2	NA	Y	Y	Coir logs intact, some erosion control fabric is visible; exposed geocall below constructed gravel river access.	2	N	Exposed geocall below constructed gravel river access.	2	Y (some geocell exposed below newly constructed river access; live stakes and erosion control fabric added)
00 + 50	45	Y		3	NA	20-30% invasive species cover. Live stakes 50% established.	3	N	No trees adjacent to edge of water	3	NA	Y	Y (30% exposed)	Newly installed erosion control fabric intact and 30% exposed	3	N	Evidence of foot traffic along the toe of slope	3	Y (new erosion control fabric and live stakes installed)
00 + 100	40	N (see notes)	Lower bank ~10 degrees (rock toe); Upper bank ~45 degrees	4,5	NA	Live stakes 50% established	4,5	N	No at-risk trees present	4,5	Y (rock toe)	Y	Y (40% exposed)	Rock toe along bank and constructed river access steps intact with evidence of disturbance due to groundhog and/or human activity	5, 6	N	Sediment deposition adjacent to rock toe boulders	4	Y (new erosion control fabric and live stakes installed; disturbance due to groundhog and/or human activity)
00 + 150	45	N (see notes)	Lower bank <5 degrees (rock toe); Upper bank ~45 degrees	7	NA	Native vegetation predominantly present; Live stakes 50% established	7,8	N	No trees adjacent to edge of water	7,8	Y (LWD and Rock toe)	Y	Y	Installed geocell and erosion control fabric intact; Some geocall exposed near groundhog burrow downstream of 00 +150'	7,9	N	Silt filling in behind LWD and in boulders	7	Y (new erosion control fabric and live stakes installed; geocall exposed near groundhog burrow)
00 + 200	55	Y		10	NA	Small patches of invasive vegetation present; live stakes 20% established.	10	N	No trees adjacent to edge of water	10	NA	Y	Y (30% exposed)	installed coir logs, geocell and erosion fabric intact	10	N	Evidence of foot traffic along the toe of slope, along coir logs	10	Y (new erosion control fabric, 2" plug plantings, and live stakes installed)
00 + 250	55	Y		11	NA	Patches of invasive vegetation present; Live stakes 20% established	11, 12	N	No trees adjacent to edge of water	11, 13	NA	Y (geocell exposed at toe)	Y (50% exposed)	Geocell intact; new erosion control fabric intact but exposed and above waterline; geocell exposed at toe below newly installed fabric	11,12	Y	Small patches of scour present around exposed geocell	12	Y (new erosion control fabric, 2" plug plantings, and live stakes installed)
00 + 300	70	Y		14	NA	Minimal vegetation present; live stakes 20% established	14	N	No trees adjacent to edge of water	14,15	NA	Y	Y (75% exposed)	installed coir logs, geocell and erosion fabric intact	14, 15	N		14	Y (new erosion control fabric, 2" plug plantings, and live stakes installed)
00 + 350	70	Y		16, 17	NA	Native vegetation present along top of bank with small patches of the invasive knotweed plant present long toe; live stakes 40% established	16	N	No trees adjacent to edge of water	16,17	NA	Y	Y (50% exposed)	installed coir logs, geocell and erosion fabric intact	16,17	N		16	Y (new erosion control fabric, 2" plug plantings, and live stakes installed)
00 + 400	60	Y		19,20,21	NA	Native vegetation present along top of bank with small patches of invasive knotweed at toe of slope; live stakes 20% established	19,20,21	N	No at-risk trees present	19,20,21	NA	Y (exposed upstream around black walnut)	Y (50% exposed)		18,19,20	N		19	Y (new erosion control fabric, 2" plug plantings, and live stakes installed)
00 + 450	50	Y		22	NA	Predominant native vegetation cover with patches of invasive vegetation present; live stakes 20% established	22	N	No at-risk trees present	22	NA	Y	Y (30% exposed)	installed coir logs, geocell and erosion fabric intact	22	N		22	Y (new erosion control fabric, 2" plug plantings, and live stakes installed)
00 + 500	40	Y	The bank design has a decreased vertical bank height (~6') compared to upstream monitoring stations	23	NA	Native vegetative present with patches of the invasive knotweed; live stakes 30% established	23	N	No trees adjacent to edge of water	23	NA	Y	Y (30% exposed)	Erosion fabric exposed near toe of bank	23	N		23	Y (new erosion control fabric and live stakes installed)
00 + 525	15	Y		24	NA	Predominantly native vegetation cover; live stakes 30% established	24	N	No trees adjacent to edge of water	24	NA	Y	Y (30% exposed)	Erosion control fabric exposed near toe of bank	24	N		24	Y (new erosion control fabric and live stakes installed)

Notes:
1, Inspection station is described as the distance (feet) upstream (-) or downstream (+) from the start of the BMA (00); example, Station 00 + 50' is 50 feet downstream from the start of the BMA
2, A significant deviation from continuous bank slope or break in grade may be used as an indicator of undercutting; consistent bank grade is evaluated as Y (yes) or N (no)
3, The extent to which roots are exposed may provide a relative measure of the magnitude of apparent erosion; extent of exposed roots is evaluated as L (low), M (moderate), H (high), or NA (not applicable- no exposed roots)
4, At-risk trees (i.e., trees that lean towards the river) typically have a greater potential to fall into the river dislodge the bank soil and erosion-control products immediately around and above the tree; presence of at-risk trees is evaluated as Y (yes) or N (no)
5, Installed rock toe and large woody debris (LWD) features are monitored to ensure that they are anchored and determine whether material has sloughed, or been eroded, or moved downstream; these installed features are evaluated as Y (yes, intact), N (no, not intact), or NA (not applicable- no installed features to monitor)
6, Installed geocell and erosion control fabric are monitored to ensure that they are intact and determine whether material is exposed or visible; these installed features are evaluated as Y (yes, intact), N (no, not intact), or NA (not applicable- no installed features to monitor)
7, The presence of local scour is assessed at the toe and center of the bank, per inspection station, as well as approximately 25 feet upstream and downstream of the start and end of the BMA; the presence of scour is evaluated as Y (yes) or N (no)

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APPENDIX A
PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Corteva	Constitution Park BMA	60594242

Photo No. 1	Date: 6/13/2019

Direction Photo Taken:

West

Description:

Station 00 – 25'

~20 degree lower bank angle; ~55 degree upper bank angle; no at-risk trees present; both native and invasive vegetation present.

Photo No. 2	Date: 6/13/2019

Direction Photo Taken:

West

Description:

Station 00 + 00'

~30 degree lower bank angle; ~55 degree upper bank angle; patches of invasive and native vegetation; coir logs intact; newly installed live stakes ~50% established; evidence of foot traffic along slope; exposed geocell below newly installed gravel path.

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APPENDIX A
PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Corteva	Constitution Park BMA	60594242

Photo No.	Date:
3	6/13/2019

Direction Photo Taken:

West

Description:

Station 00 + 50'

~ 45 degree bank angle present; no at-risk trees or exposed roots present; installation of new fabric present and 30% exposed; native vegetation is dominant with patches of invasives; coir logs intact; geocell intact; no scour observed; evidence of foot traffic along toe; planted live stakes 50% established.

Photo No.	Date:
4	6/13/2019

Direction Photo Taken:

West

Description:

Station 00 + 100'

~40 degree bank angle; no at-risk trees or exposed roots present; native vegetation is dominant, patches of invasive vegetation present; no scour observed; installed rock toe intact, with evidence of sediment deposition; installed fabric 40% exposed; planted live stakes 50% established.

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APPENDIX A
PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Corteva	Constitution Park BMA	60594242

Photo No.	Date:
5	6/13/2019

Direction Photo Taken:

West

Description:

Station 00 + 100'

Installed river access steps intact; evidence of disturbance behind installed rock toe, at base of steps; disturbance is possibly due to groundhog or human activities; some fabric exposed in area of disturbance.

Photo No.	Date:
6	6/13/2019

Direction Photo Taken:

NA

Description:

Station 00 + 100'

Exposed gravel due to a groundhog burrow adjacent to installed river access steps.

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APPENDIX A
PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Corteva	Constitution Park BMA	60594242

Photo No. 7	Date: 6/13/2019

Direction Photo Taken:

West

Description:
Station 00 + 150

~45 degree bank angle; no at-risk trees or exposed roots present; well established native vegetation; no scour observed; installed rock toe and large woody debris (LWD) intact; installed geocell and erosion control fabric intact; evidence of sediment deposition behind LWD.

Photo No. 8	Date: 6/13/2019

Direction Photo Taken:

Northwest

Description:

Station 00 + 150'

Installed rock toe intact with evidence of sediment deposition; patches of the invasive knotweed present; increasing establishment of native vegetation

APPENDIX A
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Client Name:	Site Location:	Project No.
Corteva	Constitution Park BMA	60594242

Photo No. 9	Date: 6/13/2019

Direction Photo Taken:

Southwest

Description:

Station 00 + 150'

Groundhog burrow downstream of 00 + 150'; exposed geocell around groundhog burrow.

Photo No. 10	Date: 6/13/2019

Direction Photo Taken:

West

Description:

Station 00 + 200'

~55 degree bank angle; increased native grass cover with small patches of invasive vegetation; installed live stakes 50% established; 2" plug plantings remain healthy; no scour observed; erosion control fabric 30% exposed; foot path along coir logs; newly installed coir logs intact.

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APPENDIX A
PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Corteva	Constitution Park BMA	60594242

Photo No. 11	Date: 6/13/2019

Direction Photo Taken:

West

Description:

Station 00 + 250'

~55 degree consistent uniform bank angle; no exposed roots; small patches of invasive vegetation present; installed live stakes 20% established; newly installed coir logs intact; erosion control fabric 50% exposed.

Photo No. 12	Date: 6/13/2019

Direction Photo Taken:

NA

Description:

Station 00 + 250'

Newly installed coir logs intact; 2" plug plantings remain healthy; small areas of scour and exposed geocell at toe of slope, below newly installed fabric.

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APPENDIX A
PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Corteva	Constitution Park BMA	60594242

Photo No. 13	Date: 6/13/2019

Direction Photo Taken:

Southwest

Description:

Station 00 + 250'

Small patches of invasive vegetation present; increased cover of native grasses; live stakes installed; evidence of foot traffic along coir logs; geocell intact; newly installed coir logs intact.

Photo No. 14	Date: 6/13/2019

Direction Photo Taken:

West

Description:

Station 00 + 300'

~70 degree uniform bank angle; no exposed roots or at-risk trees; no scour observed; increased vegetation cover; erosion control fabric 75% exposed; geocell and installed coir logs intact; installed live stakes 20% established; 2" plug plantings remain healthy.

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APPENDIX A
PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Corteva	Constitution Park BMA	60594242

Photo No. 15	Date: 6/13/2019

Direction Photo Taken:

Northwest

Description:

Station 00 + 300'

Predominantly native vegetation present; live stakes installed at toe of slope; erosion control fabric exposed near toe of slope; geocell and installed coir logs intact.

Photo No. 16	Date: 6/13/2019

Direction Photo Taken:

Northwest

Description:

Station 00 + 350'

~70 degree bank angle; no exposed roots or at-risk trees; no scour observed; native vegetation with small patches of the invasive knotweed present; live stakes 40% established; geocell and installed coir logs intact; newly installed erosion control fabric 50% exposed; 2" plug plantings remain healthy.

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APPENDIX A
PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Corteva	Constitution Park BMA	60594242

Photo No. 17	Date: 6/13/2019

Direction Photo Taken:

Southwest

Description:

Station 00 + 350'

Increased vegetative cover, including native grasses; installed erosion control fabric 50% exposed; installed coir logs intact.

Photo No. 18	Date: 6/13/2019

Direction Photo Taken:

Northwest

Description:

Between 00 + 350' and 00 + 400' stations

Erosion control fabric exposed along toe of slope; geocell exposed around base of tree downstream of 00 + 350'; newly installed live stakes 20% established.

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APPENDIX A
PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Corteva	Constitution Park BMA	60594242

Photo No. 19	Date: 6/13/2019

Direction Photo Taken:

West

Description:

Station 00 + 400'

~60 degree bank angle; predominantly native vegetation present along top of bank with small patches of invasive knotweed at toe of slope; no exposed roots; no at-risk trees; no scour present; installed live stakes 20% established.

Photo No. 20	Date: 6/13/2019

Direction Photo Taken:

Southwest

Description:

Station 00 + 400'

Installed coir logs intact; limited vegetation present at bottom of bank; geocell exposed around base of black walnut tree; installed erosion control fabric 50% exposed.

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APPENDIX A
PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Corteva	Constitution Park BMA	60594242

Photo No.	Date:
21	6/13/2019

Direction Photo Taken:

Northwest

Description:

Station 00 + 400'

Installed coir logs intact; erosion control fabric exposed near toe of bank; installed live stakes 20% established.

Photo No.	Date:
22	6/13/2019

Direction Photo Taken:

West

Description:

Station 00 + 450'

~50 degree bank angle; no exposed roots or at-risk trees; no scour observed; predominant native vegetation cover with patches of invasive vegetation present; erosion control fabric 30% exposed, particularly near toe of bank; installed live stakes 50% established; 2" plug plantings remain healthy.

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APPENDIX A
PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Corteva	Constitution Park BMA	60594242

Photo No. 23	Date: 6/13/2019

Direction Photo Taken:

West

Description:

Station 00 + 500'

~40 degree bank angle; no exposed roots or at-risk trees; no scour observed; native vegetative present but with patches of the invasive knotweed; installed live stakes 30% established. Erosion control fabric 30% exposed, particularly at toe of slope.

Photo No. 24	Date: 6/13/2019

Direction Photo Taken:

West

Description:

Station 00 + 525'

~15 degree bank angle; no exposed roots or at-risk trees; no scour observed; erosion control fabric 30% exposed with predominantly native vegetation cover.

Appendix B - Waynesboro Off-Site Cap Areas

Inspection Record Sheet

Maintenance Plan

Location and property owner name: Constitution Park BMA (STM-01)		
Item	Status/ Maintenance Needs	Repairs Needed?
Access Roads	NA	NA
Trails	Stairs, Greenway, and newly installed gravel path intact	1
Drainage Structures	Drainage Structures Intact	1
Outfall Structures	Outfall Structures Intact	1
Rip-Rap Protection	Rip-Rap Intact	1
Cap System Vegetative Cover	Recently planted 2" plugs, installed live stakes, and applied hydroseed have increased native vegetation coverage, although small patches of the invasive Japanese knotweed still exist. Vegetation cover will continue to be monitored in the fall of 2019.	1
Cap System Geosynthetics	Areas of the cap system that needed to be repaired were successful repaired in the spring of 2019. The cap system will continue to be monitored in the fall of 2019	1
Cap System Slope Stability	Slope is generally consistent and stable	1
Cap System Subsidence	Slight subsidence near the uppermost section of the BMA associated with foot traffic at the toe of the slope	1
Fencing and Gates	Fencing intact	1

* 1. Functioning properly; no repairs needed

2. Repairs needed (describe why, what and where), but not time critical

3. Time critical repair needed (describe what and where)

* * Yes/ No

Comments: small areas of new erosion and exposed geocell / erosion control fabric

Inspected by: Andrew Hally and Andrew Miano Date: June 13th 2019