

Site Inspection Report
The Spires Broadmoor Drainage Homeowner's Association
Drainageway Inspections
Colorado Springs, Colorado

Prepared for:
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Kiowa Project No. 13060

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I. General Description

The existing drainageways within The Spires Broadmoor Drainage Homeowner's Association were inspected on October 22nd and 28th, 2013. The drainageways were inspected to determine which of the drainageways may require maintenance after the major storm events that occurred between September 10th and September 15th. Z&R Property Management Company contacted Kiowa Engineering to perform this inspection.

II. Drainageway Condition

The following contains brief descriptions of the condition of the inspected drainageways. Please refer to the Appendix for a site map showing the drainageway locations and a vicinity map. In order to simply this report, Kiowa has rated the condition of the drainageways as follows:

Good Condition: The drainageway is in good condition with no areas requiring immediate attention at this time. Minor erosion may exist in some areas along the drainageway.

Monitor Condition: The drainageway is in good to fair condition with some areas or erosion that should be monitored.

Debris/Sediment Removal Only: The drainageway includes debris and/or sediment that is recommended to be removed. No other action is recommended unless otherwise noted.

Repairs Suggested: Areas along the drainageway in need of repairs to stabilize eroded areas, remove debris/sediment or improve the drainage. These repairs do not need to be performed immediately but the HOA should plan to perform the repair/maintenance in the future.

Repairs Recommended: Areas along the drainageway in need of repairs to stabilize eroded areas, remove debris/sediment or improve the drainage. These repairs should be performed as soon as possible.

Drainage 1: The drainage is located within Lots 10, 12 and 13 of Stonecliff Filing No. 6A [485, 505, & 515 Paisley Drive]. The portion of the drainageway downstream of the Lot 12 flag lot is in good condition. The drainageway upstream of the flag lot includes areas with moderate and major erosion. Refer to the map for locations.

Action: Repairs Recommended. See map and descriptions below for locations.



Photo 1A North: Major erosion and under cutting along Lot 1, Stonecliff Filing No. 6 [525 Paisley Drive] and Lot 13 Stonecliff Filing No. 6A [515 Paisley Drive] immediately east of the Air Force property where drainage comes onto property. *Action: Repairs Recommended. Protect bank from eroding further.*

Photo 1B North: Moderate erosion along the side slopes of the bank (Lot 1, Stonecliff Filing No. 6 and Lot 13 Stonecliff Filing No. 6A east of the Air Force property). *Action: Repairs Suggested. Stabilize side slopes and channel.*



Photo 1C North: Moderate erosion along the side slopes of the bank (Lot 1, Stonecliff Filing No. 6 and Lot 13 Stonecliff Filing No. 6A east of the Air Force property). *Action: Repairs Suggested. Stabilize channel side slopes.*

Drainage 2: The drainage is located along Lots 108, 109, 112 and 113 in Boulders Broadmoor Filing No. 2 [348 & 332 Darlington Way, 6010 Hardwick Drive, & 5830 Broadmoor Bluffs Drive]. The drainageway is in good condition overall.

Action: Good Condition. No action recommended.

Photo 2A Southwest: Minor erosion on south side of ditch behind Lot 109 Boulders Broadmoor #2 [332 Darlington Way]. *Action: Good Condition. No action recommended.*



Drainage 3: The drainage is located along Lots 75, 76, 79 – 83, 99 - 101 in Boulders Broadmoor Filing No. 2 [5935 & 5955 Gladstone Street, 420, 410, 390, 380, & 370 Paisley Drive, 411, 427, & 423 Darlington Way]. The drainageway is in good condition overall.

Action: Good Condition. No action recommended.



Photo 3A Southwest: Moderate to minor erosion in the drainageway behind Lot 81 Boulders Broadmoor #2 [390 Paisley Drive]. *Action: Good Condition. The sideslopes of eroded areas could be flattened if concerned about drop off.*

Drainage 4: The drainage is located along Lots 1, 2, 19 – 21 Spires Broadmoor Filing No. 2 [6089, 6085 Buttermere Drive, 5920, 5930, & 5940 Gladstone Street] and lots 28 – 31 Stonecliff Filing No. 6 [6095 Buttermere Drive, 590, 580, & 570 Paisley Drive]. Repairs suggested along the drainageway and areas should be monitored. There are several areas along the drainageway where vertical eroded banks exist between 4-7 feet in height. The eroded areas are not threatening any structures; however the HOA should review to determine if action should be taken from a safety standpoint. The vegetation is very thick along drainageway. Dead branches are located in a few locations along the drainageway that should be removed.

Action: Debris/Sediment Removal. At a minimum, remove the dead branches and monitor the eroded vertical side slopes along the drainageway. Several areas could be stabilized to minimize future erosion. Side slopes of eroded areas could be flattened if concerned about drop off and safety. Monitor Condition of ground at outlet of culvert under Paisley Drive.



Photo 4A West: Significant erosion along the drainageway behind Lots 1, 2 and 19 Spires Broadmoor Filing No.2 resulting in vertical side slopes.

Action: Debris/Sediment Removal at a minimum and Monitor Condition of the eroded vertical side slopes.

Drainage 5: The drainage is located between Lots 6 and 7 in Stonecliff Filing No. 6 [585 & 595 Paisley Drive]. The drainageway is in good condition overall.

Action: Good Condition. No action recommended.

Photo 5A Southwest: Minor erosion along drainageway side slopes. Drainageway in good condition. *Action: Good Condition. No action recommended.*



Photo 5C Northwest: Silt in roadway in front of Lot 8 Stonecliff Filing No. 6 [605 Paisley Drive]. Silt appears to be coming from Lots 9 and 10 [615 & 635 Paisley Drive] to the north. Refer to Drainage 6 description. The silt has been removed from the street since the photo was taken. *Action: No action required in Drainage 5, refer to Drainage 6 description.*

Drainage 6: The drainage is located along and within Lots 9 and 10 Stonecliff Filing No. 6 [615 & 635 Paisley Drive]. The home in Lot 10 had drainage problems during the storm events. It is apparent that repairs occurred along the southern leg of the drainageway either during or immediately after the storm events. Sandbags were installed on the NORAD property to direct flows from the existing culvert.

Action: Repairs Recommended. The repairs should include defining a drainage path to the culvert inlet at Paisley Drive, constructing a swale for the northwest leg of the drainage (see below) through Lot 10 and stabilizing the southwest swale.

Photo 6A Northeast: A swale should be cut through this easement to direct flows to the culvert. The location of existing utilities in the easement will need to be determined to verify the location and size of a swale. *Action: Repairs Recommended. Construct a swale to the existing culvert at Paisley.*





Photo 6B Northwest: The existing swale is too small to convey the flows from the upstream area. *Action: Repairs Recommended. A swale and berm should be cut through backyard of Lot 10 to direct flows into the easement and towards the existing culvert at Paisley.*

Photo 6C Southwest: A swale with sandbags and a culvert were installed upstream of the fence on the NORAD property. *Action: Repairs Recommended. The swale downstream of the NORAD property should be protected from future erosion.*



Drainage 7: The drainage is located along Lots 59 and 62, Boulders Broadmoor Filing No. 2 [5748 Adrienne Court & 5620 Gladstone Street]. The drainageway is in good overall condition.

Action: Good Condition. No action recommended.



Photo 7A West: Small pine trees and a clump of aspens exist in the channel along the back of Lot 59 [5748 Adrienne Court]. *Action: Monitor Condition. Monitor the trees and condition to avoid accumulation of debris along trees that would reduce the flow capacity of the drainageway.*

Photo 7C East: Silt in the sidewalk chase between Lots 58 and 59 Boulders Broadmoor Filing No. 2 [5736 & 5748 Adrienne Court]. *Action: Good Condition. No action required, unless it continues to be an issue. Contact City if it continues to be an issue.*



Drainage 8: Drainage is located along Lots 54 and 55 Boulders Broadmoor Filing No. 2 [5723 & 5711 Adrienne Court] and Lots 82 and 83 Stonecliff Filing No. 6 [5955 & 5965 Buttermere Drive]. Several areas of erosion along the drainageway including areas with vertical side slopes. The worst of the erosion is between Lots 82 and 83 [5955 and 5965 Buttermere Drive] downstream of Buttermere. There are steep eroded slopes along Lots 54 and 55 [5723 & 5711 Adrienne Court], but it is not significant enough to require repairs.

Action: Repairs Recommended. Repair areas where erosion has created 6-foot +/- vertical banks in Lots 82 and 83. Monitor condition of drainageway for remainder of drainageway.



Photo 8A West: Significant erosion downstream of Buttermere Drive resulting in 6-foot +/- vertical sideslopes. *Action: Repairs Recommended. Stabilize existing side slopes and drainage bottom.*

Photo 8B East: Moderate erosion between Lots 54 and 55. *Action: Monitor Condition of drainageway and side slopes.*



Drainage 9: The drainage is located along Lots 19 – 22, 41 and 42 Stonecliff Filing No. 6 [730, 740, 720 & 710 Paisley Drive & 610 Buttermere Drive & 360 Ellsworth Street]. The drainageway is in good overall condition with only minor erosion in areas.

Action: Good Condition. No action necessary.



Photo 9A Southwest: Minor erosion in a few areas along Lot 19 [730 Paisley Drive]. *Action: Good Condition. No action necessary.*

Drainage 10: The drainageway is located in Lots 16 and 17 [715 Paisley Drive]. The drainageway includes an existing metal culvert upstream of Paisley Drive and it is located near an existing home.

Action: Repairs Recommended. Repairs to stabilize area between existing culverts to minimize future erosion and protect the building foundation.

Photo 10A Southeast: Significant erosion downstream of the large boulders shown in the photo along the side slopes and bottom. *Action: Repairs Recommended. Repairs to stabilize channel bottom and side slopes upstream of Paisley culvert.*





Photo 10B Northeast: Minor erosion between the existing steel culvert and the NORAD property. *Action: Good Condition. No action recommended.*

Drainage 11: The drainageway is located along Lot 17 Spires Broadmoor Filing No. 1 [210 Balmoral Way], Lots 3, 4 & 5 Spires Broadmoor 1-A [220, 170 & 160 Balmoral Way]. The drainageway is in good overall condition.

Action: Repairs Suggested. Repairs in a few locations along the drainageway, Debris Removal, and Monitor Condition, otherwise the drainageway is in good condition.

Photo 11A West: Minor undercutting and erosion at flared end section (FES) between Lot 17 Spires Broadmoor Filing No. 1 [210 Balmoral Way], Lots 3 Spires Broadmoor 1-A [220 Balmoral Way]. . *Action: Repairs Suggested. Install riprap at end of flared end section to protect from future erosion and raise drainageway invert to be flush with FES.*



Photo 11B East: Minor erosion and debris at clump of willows between Lot 17 Spires Broadmoor Filing No. 1 [210 Balmoral Way], Lots 3 Spires Broadmoor 1-A [220 Balmoral Way]. *Action: Debris/Sediment removal and Monitor Condition. Remove debris from channel.*

Photo 11D West: Minor erosion in channel behind Lot 5 Spires Broadmoor 1-A [160 Balmoral Way]. *Action: Monitor Condition.*



Photo 11F West: Moderate vegetation in channel behind Lot 1 Country Walk at Broadmoor No. 3 [150 Balmoral Way]. Vegetation may become dense enough to impede decrease flow capacity in drainageway. *Action: Monitor Condition.*

Drainage 12: The drainageway is located along Lots 11 – 21 Spires at Broadmoor Filing No. 1 [281, 275, 225, 214 Balmoral Way, 5904 & 5906 Buttermere Drive, 295 & 285 Ellsworth Street]. Minor erosion and vegetation in channel north of Lot 18 [5904 Buttermere Drive]. The rest of the drainageway is in good condition.

Action: Monitor Condition. Monitor the erosion and vegetation in channel north of Lot 18. The rest of the drainageway is in good condition and no action is recommended.



Drainage 13: Drainageway is located along Lots 22, 23 and Tract A of Spires at Broadmoor Filing No. 1 [327 & 351 Irvington Court & 270 Ellsworth Street]. The drainageway is in good condition overall.

Action: Good Condition. No action recommended.

Drainage 14: The drainageway is located in Lots 24, 26 and Tract A of Spires at Broadmoor Filing No. 1 [359 & 367 Irvington Court & 270 Ellsworth Street]. The drainageway is not well defined (20-30-ft wide) at southwest corner of Ellsworth Street and Irvington Court. Some minor erosion along the drainageway.



Action: Good Condition. No action is recommended. The drainageway could be cleaned up to promote vegetation. This would minimize the amount of sediment available to be carried downstream and improve appearance of drainageway near Ellsworth if desired.

Drainage 15: The drainageway is located between Lots 34 and 35 of the Spires Broadmoor Filing No. 1 [366 & 358 Irvington Court]. The drainageway is in good condition overall.

Action: Good Condition. No action recommended.

Drainage 16: The drainageway is located between Lots 37 and 38 of the Spires Broadmoor Filing No. 1 [342 Irvington Court & 5798 Wellfleet Street]. The drainageway is in good condition overall.

Action: Good Condition. No action recommended.

Drainage 17: The drainageway is located along the north side of Lots 1 – 10 of the Spires Broadmoor Filing No. 1 [151, 147, 143, & 139 Kirkstone Lane, 256, 262, 268, 274, 280, & 286 Balmoral Way]. The drainageway is in good condition overall.

Action: Good Condition. No action recommended.

Drainage 18: The drainageway is located along south side of Lots 28, 29, 32, 37, 40, 42 and 43 Boulders Broadmoor Filing No. 1 [5425, 5455, 5475, 5535, 5565, 5585, & 5595 Jarman Street]. The middle section of this drainageway has several areas of erosion where the vertical drop is 3-feet. A couple areas where vegetation is thick or a tree is located in the center of drainageway catching debris. Erosion has occurred near the corner of the house at 120 Ellsworth Street where a portion of the lawn has been lost.

Action: Repairs Recommended. Repair drainageway side slope along 120 Ellsworth Street to protect from future erosion and possibly to restore some of the lost lawn of the land owner. The debris along the drainageway should be removed. Monitor the condition of the eroded banks and monitor the vegetation growth.

Photo 18I West: Moderate erosion near the rear corner of house at 120 Ellsworth Street. *Action: Repairs Recommended. Protect from future bank erosion at corner of lawn.*

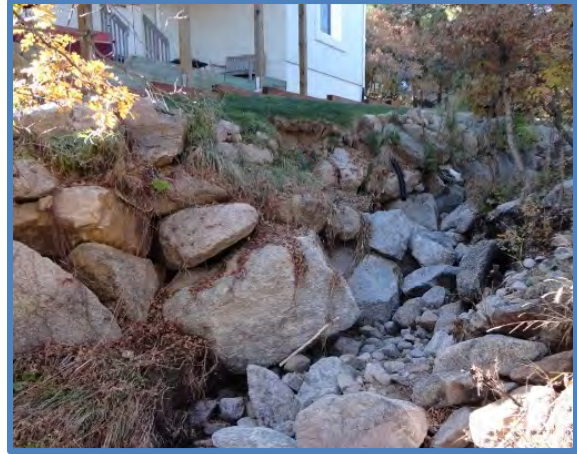


Photo 18B West, 18C East and 18G West: Moderate erosion in channel (3-ft deep). *Action: Debris/Sediment removal from drainageway. Monitor Condition of eroded drainageway sections.*



Drainage 19: The drainageway is located along Lots 4 – 6 Boulders Broadmoor Filling No. 1A [5610 Jarman Street, 235 & 245 Stonebeck Lane] and Lots 3 and 4 Boulders Broadmoor Filing No. 1B [255 & 265 Stonebeck Lane]. Moderate erosion (2-4 feet deep) in many locations along the drainageway. The section upstream of the Lot 6 flag is in the most need of attention. A large boulder in the middle of the drainageway adjacent to Lot 4, pushes larger flows into the adjacent side slope creating erosion.

Action: Repairs Recommended. Repairs along Lot 4 to stabilize the existing drainageway. The soil berm in this area should be stabilized to protect the home at Lot 4 [255 Stonebeck Lane]. Repairs suggested include removing sediment and rocks from existing culvert under the Lot 6 flag [245 Stonebeck Lane] and removing debris from the entire drainageway. Monitor the condition of the eroded slopes along the entire drainageway.

Photo 19A West: Moderate erosion in drainageway and exposed soil berm along berm between drainageway and home. *Action: Repairs Recommended. Stabilize the berm to protect the home at Lot 4 [5610 Jarman Street].*



Drainage 20: The drainageway is located in Lot 3 Boulders Broadmoor 1B [275 Stonebeck Lane]. The drainageway is in good condition overall.

Action: Good Condition. No action recommended.

Drainage 21: The drainageway is located in Lots 2 – 3 Boulders Broadmoor Filing No. 1C [275 & 270 Stonebeck Lane]. Significant erosion is visible along the drainageway.

Action: Repairs Recommended. Repairs along drainageway, refer to the following.



Photo 21A Northwest: Moderate erosion in drainageway to a depth of approximately 2-4 feet in front of Lot 3 [265 Stonebeck Lane]. *Action: Repairs Recommended. Stabilize the drainageway and/or flatten side slopes.*



Photo 21C Northwest: Severe erosion at downstream end of private corrugated metal culvert in front of Lot 3 [275 Stonebeck Lane]. *Action: Repairs Recommended. Stabilize ground at outlet of pipe.*

Photo 21D Northwest and 21E Southeast: Moderate erosion (3 – 4 feet deep) along section of drainageway upstream of CMP at Lot 3 [275 Stonebeck Lane]. *Action: Repairs Recommended. Stabilize ground in drainageway between the boulder side walls.*



Drainage 22: The drainageway is located in Lot 1 Boulder Broadmoor 1C [120 Gilford Place]. The drainageway is in good condition overall.

Action: Good Condition. No action recommended.

Drainage 23: South Debris Basin. The basin incurred minimal erosion and appears to have functioned as designed. Approximately 24 inches of silt has accumulated in the bottom. The swale directing flows down the northwest corner of the debris basin does not include riprap and has moderate erosion.

Action: Debris/Sediment Removal Only. Remove the sediment from the bottom of the basin. Remove sediment and debris from upstream end of culvert on northwest side. Monitor condition of erosion in northeast swale.










Drainage 24: North Debris Basin. Approximately 12-24 inches of water has been standing in the bottom of the basin since the storm events. A drainage to the southwest of the basin, bypassed the basin and caused erosion to the south of the basin. A berm and swale has been constructed since the storm events, however it appears the north end of the swale is higher than the south.

Action: Repairs Recommended. Determine why water is standing in the bottom. Remove the sediment from the bottom of the basin. Excavate the new swale to drain by gravity with minimal ponding to the debris basin. Revegetate the disturbed areas.

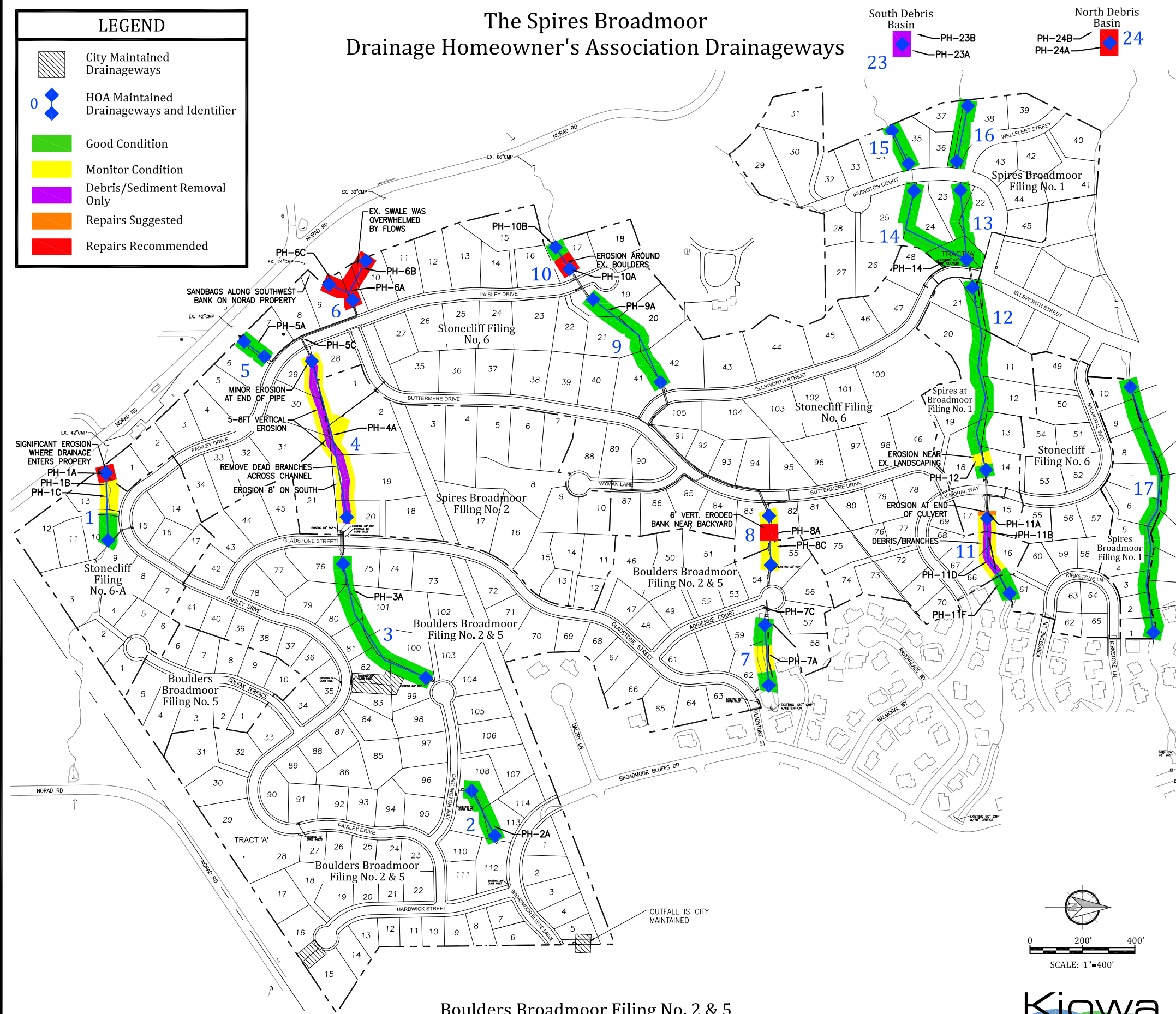


APPENDIX
Site Map

LEGEND

-  City Maintained Drainageways
-  HOA Maintained Drainageways and Identifier
-  Good Condition
-  Monitor Condition
-  Debris/Sediment Removal Only
-  Repairs Suggested
-  Repairs Recommended

The Spires Broadmoor Drainage Homeowner's Association Drainageways



Boulders Broadmoor Filing No. 2 & 5
Stonecliff Filing No. 6 & 6A
Spires Broadmoor Filing No. 1 & 2



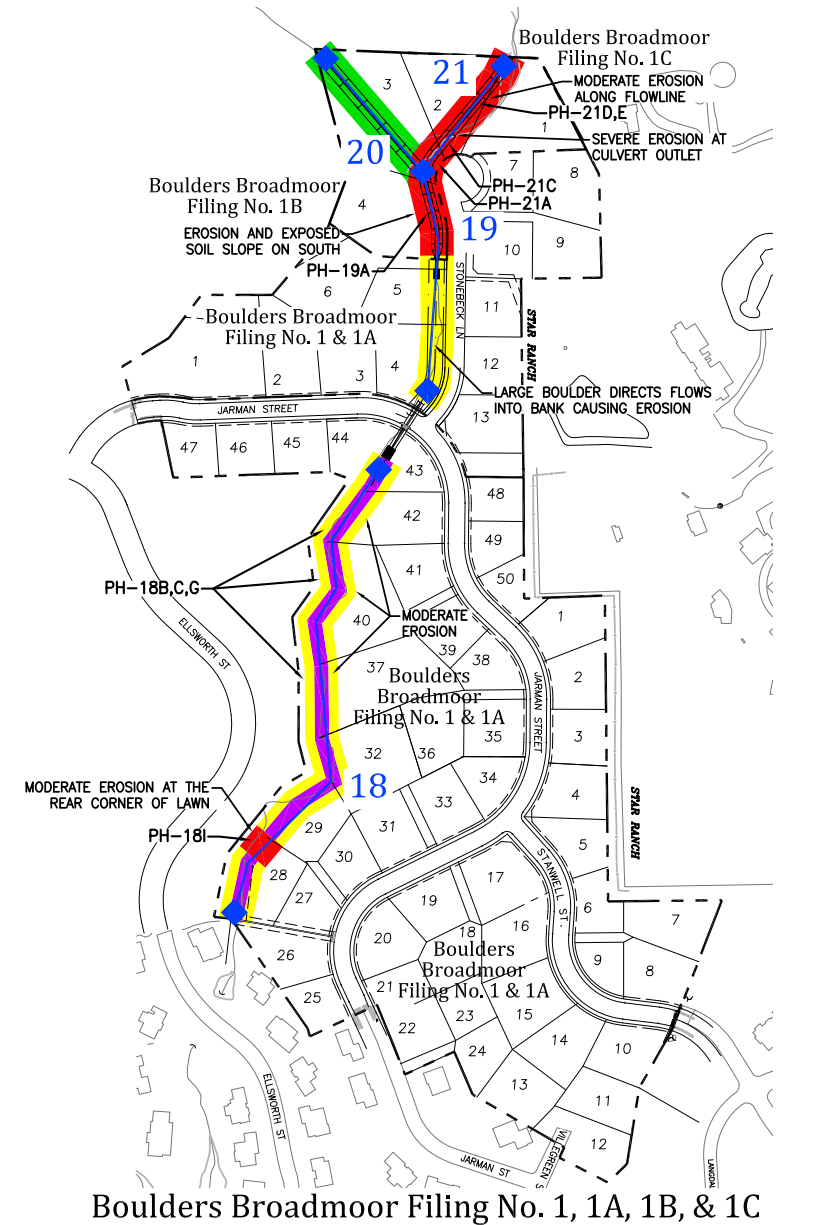
1604 South 21st Street
Colorado Springs, Colorado 80904
(719) 630-7342

South Debris Basin
PH-23B
PH-23A

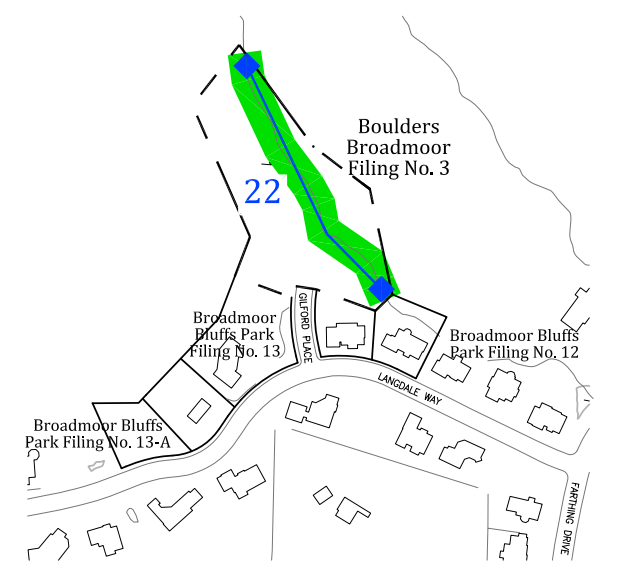
North Debris Basin
PH-24B
PH-24A

23

24



Boulders Broadmoor Filing No. 1, 1A, 1B, & 1C



Boulders Broadmoor Filing No. 3