

APPENDIX C—FEDERAL AVIATION ADMINISTRATION WILLIAM J. HUGHES TECHNICAL CENTER WIND TUNNEL TESTING

C.1 WIND TUNNEL TESTING.

At the Federal Aviation Administration (FAA) William J. Hughes Technical Center wind tunnel tests (figure C-1) were performed on the various fiber lengths of artificial turf to determine how high winds and jet blasts might affect the ballast sand infill. These tests were meant to simulate the effects over 1 month of jet blast and high winds to determine how often the ballast sand must be replaced during normal operations. It should be noted that the testing being performed was to quantify the artificial turf and not to qualify the turf.



FIGURE C-1. TEST PLOT INSTALLED AT THE FAA WILLIAM J. HUGHES TECHNICAL
CENTER WIND TUNNEL

Each manufacturer has a unique honeycomb shape cut to their fiber that acts like a net to trap the sand inside the artificial turf. How the ballast sand remains in the artificial turf comes from how each individual fiber is cut. With a jet blast or heavy winds, the fiber folds over the top of the sand and traps the sand within the honeycomb pattern. The purpose of the wind tunnel test was to determine how the composition of each manufacturer's turf holds up in relation to simulated aircraft traffic at an airport for 1 month. Of the two manufacturers that participated in the tests, only one manufacturer had multiple configurations. AvTurf tested one fiber length; a 2-inch fiber with a sand infill. Air FieldTurf brought along four different fiber lengths (2.5", 2.0", 1.5", and 1.0") as well as two types of infill (sand and pebble).

The artificial turf was installed on a test plot area consisting of a 12- by 12-ft raised platform that allowed for a modified installation of the artificial turf product. The test plot installation of the artificial turf did not mimic an actual airport installation.

C.2 BACKGROUND.

During September 2000, estimated exposure times equivalent to conditions measured on the Runway 22 overrun area at LaGuardia Airport (LGA) were established for the platform located behind the FAA William J. Hughes Technical Center wind tunnel*. These estimates established the amount of time at various power settings to be equivalent to 1 month’s exposure at LGA with the traffic mix depicted in table C-1. Ultimately, the power setting profiles contained in table C-2 were established to estimate LGA conditions at 40 and 75 feet from the overrun area.

TABLE C-1. TRAFFIC MIX FOR 1 MONTH AT LGA

Aircraft Category	Takeoffs	Landings	Maximum Takeoff Speed (mph)
B-727	66	32	200
B-737	108	34	250
B-757	54	7	250
B-767	8	3	250
C19	11	9	136
C20	60	22	
DC-9	102	31	200
F100	23	16	
Other	27	21	-
Regional Jet	67	26	-
Turboprop	100	55	-

Note: The reader should take into account that the aircraft mix for LGA traffic did not include heavy large aircraft like the Boeing 747 and 777 or the Airbus 340 and 380.

* Geoffrey J. Frank, “Summary of Measured Data and Recommendations for Testing on Platform Behind FAA Wind Tunnel,” 28 September 2000.

TABLE C-2. RECOMMENDED PROFILES FOR SIMULATING LGA CONDITIONS

Average at 40 feet		Average at 75 feet	
12 repetitions for 1 month		12 repetitions for 1 month	
Time (sec)	Power (%)	Time (sec)	Power (%)
0	85	0	85
240	85	180	85
250	90	190	90
375	90	280	90
380	85	290	85
565	85	470	85
580	100	485	100
595	100	495	100
600	85	510	85

The testing process used at the FAA William J. Hughes Technical Center wind tunnel mimicked the profiles that simulated LGA conditions. The tests consisted of various thrust settings and durations of thrust that equate to being 40 or 75 feet from a runway. The tests were performed over 8- to 10-minute intervals. Once one test run was completed (12 cycles), measurements were taken to determine migration of sand, as shown in figure C-2, in relation to the baseline measurement depth of the sand. Both manufacturers tested their products at the wind tunnel on the following dates:

- Test 1—AvTurf, 2.0-inch fiber: 4 months at 75 ft and 3 months at 40 ft, 08/12/03
- Test 2a—Air FieldTurf, 2.5-inch fiber: 1 month at 75 ft and 1 month at 40 ft, 10/07/03
- Test 2b—Air FieldTurf, 2.5-inch fiber: 1 month at 75 ft and 1 month at 40 ft, 10/08/03
- Test 3—Air FieldTurf, 2.0-inch fiber: 1 month at 75 ft and 1 month at 40 ft, 10/09/03
- Test 4—Air FieldTurf, 1.0-inch fiber: 1 month at 75 ft and 1 month at 40 ft, 12/03/03
- Test 5—Air FieldTurf, 1.5-inch fiber: 1 month at 75 ft and 1 month at 40 ft, 02/04/04
- Test 6—Air FieldTurf, 2.0-inch fiber, glued (no infill): 4 cycles at 40 ft, 03/09/04
- Test 7—Air FieldTurf, 2.0-inch fiber, glued (with infill): 1 month at 40 ft, 03/10/04
- Test 8—Air FieldTurf, 1.5-inch fiber, 4 cycles at 40 ft, 03/11/04



FIGURE C-2. MEASURING SAND MOVEMENT AFTER TEST RUN

The tests were conducted using the wind tunnel power setting profiles for 40 and 75 ft on the different artificial turf as discussed in sections C.3 through C.11.

C.3 TEST 1—AVTURF 2.0-INCH FIBER.

The artificial turf was installed on the test plot with a header system and the standard ballast sand infill. Measurement points of 1 by 1 ft were marked into the turf surface to determine sand depths (figure C-3). A total of 12 rows and 11 columns were marked. Figure C-4 is a cross-sectional view of the AvTurf installation used in the wind tunnel tests.

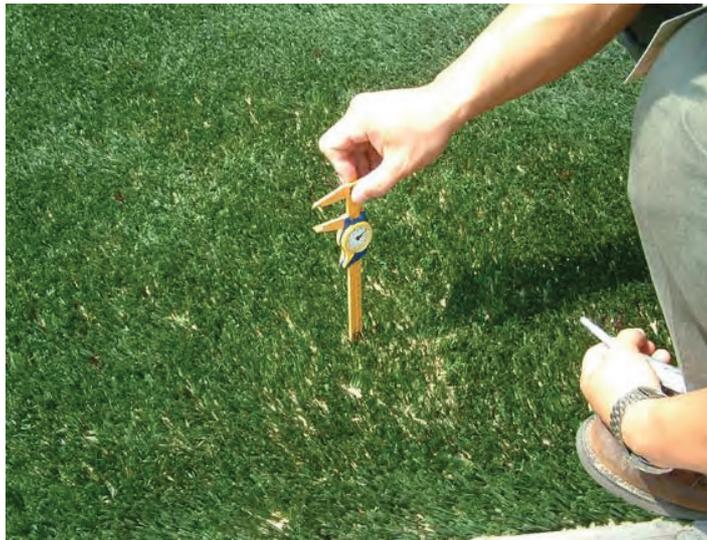


FIGURE C-3. MEASURING SAND MOVEMENT

AvTurf® WINDTUNNEL DEMO - FAA WILLIAM J. HUGHES TECHNICAL CENTER

DRAWING NOT TO SCALE

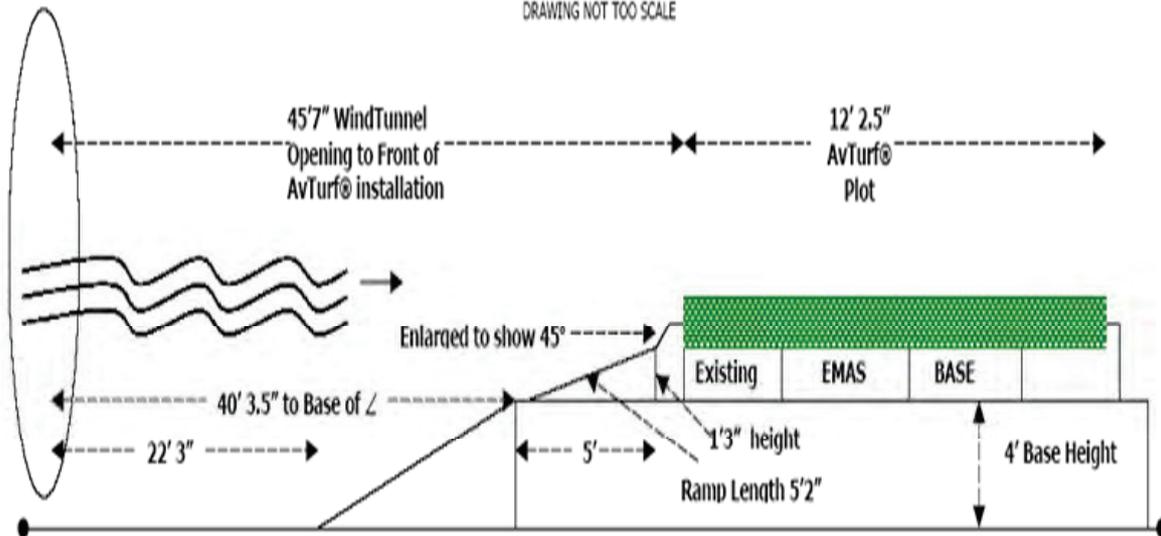


FIGURE C-4. AVTURF ENGINEERING DRAWING FROM WIND TUNNEL TEST

C.3.1 TEST 1 RESULTS.

- Baseline (figure C-5). The baseline depth of the ballast sand measured from 0.50 to 1.45 inches.
- Run 1—1 Month at 75 ft (figure C-6). Once the test was completed, measurements were taken. The depth of the ballast sand measured from 0.50 inch (front) to 1.75 inch (rear). Moderate sand movement was noted. It was determined that the 2.0-inch fiber was successful for 1 month at 75 ft.
- Run 2—1 Month at 75 ft (figure C-7). After the first test was conducted and measurements were taken, another 1-month test was conducted at 75 ft. There was no sand added to the artificial turf test plot. Once the test was completed, measurements were taken. The sand depth measured from 0.25 inch (front rows) to 1.35 inches (rear rows). Moderate sand migration was noted. It was determined that the 2.0-inch fiber was successful for a second month at 75 ft.
- Run 3—1 Month at 75 ft (figure C-8). After the second test was conducted and measurements were taken, another 1-month test was conducted at 75 ft. There was no sand added to the artificial turf test plot. Once the test was completed, measurements were taken. The sand depth measured from 0.00 inch (front rows) to 1.25 inches (rear rows). Extensive sand migration away from the front edge of the installation was observed.

- Run 4—1 Month at 75 ft (figure C-9). After the third test was conducted and measurements were taken, another 1-month test was conducted at 75 ft. There was no sand added to the artificial turf test plot. Once the test was completed, measurements were taken. The sand depth measured from 0.05 inch (front rows) to 1.25 inches (rear rows). Extensive sand migration away from the front edge of the installation was again observed. Along the front middle portion of the installation, a cone shape zone developed that contained no sand. The peak of this cone was at row 2.
- Run 5—1 Month at 40 ft (figure C-10). After the fourth test was conducted and measurements were taken, run 5 was initiated with a 40-ft jet blast simulation. There was no sand added to the artificial turf test plot. At this point, the sand depth measured from 0.00 inch (front rows) to 1.25 inches (rear rows). The ballast sand continued to migrate extensively away from the front middle portion of the installation, enlarging the cone shape. The cone with no sand reached up to row 3 with its peak being at column 9.
- Run 6—1 Month at 40 ft (figure C-11). After the fifth test was conducted and measurements were taken, another 1-month test was conducted at 40 ft. There was no sand added to the artificial turf test plot. At this point, the sand depth measured from 0.00 inch (front rows) to 1.25 inches (rear rows). The ballast sand continued to migrate extensively away from the front middle portion of the installation, enlarging the cone shape. The cone with no sand reached up to row 4 with its peak being at columns 8 and 9.
- Run 7—1 Month at 40 ft (figure C-12). After the sixth test was conducted and measurements were taken, another 1-month test was conducted at 40 ft. There was no sand added to the artificial turf test plot. At this point, the sand depth measured from 0.00 inch (front rows) to 1.25 inches (rear rows). The ballast sand continued to migrate extensively away from the front middle portion of the installation, enlarging the cone shape. The cone with no sand reached up to row 5 with its peak being at columns 8 and 9.

AvTurf Wind Tunnel Test 8/12/03

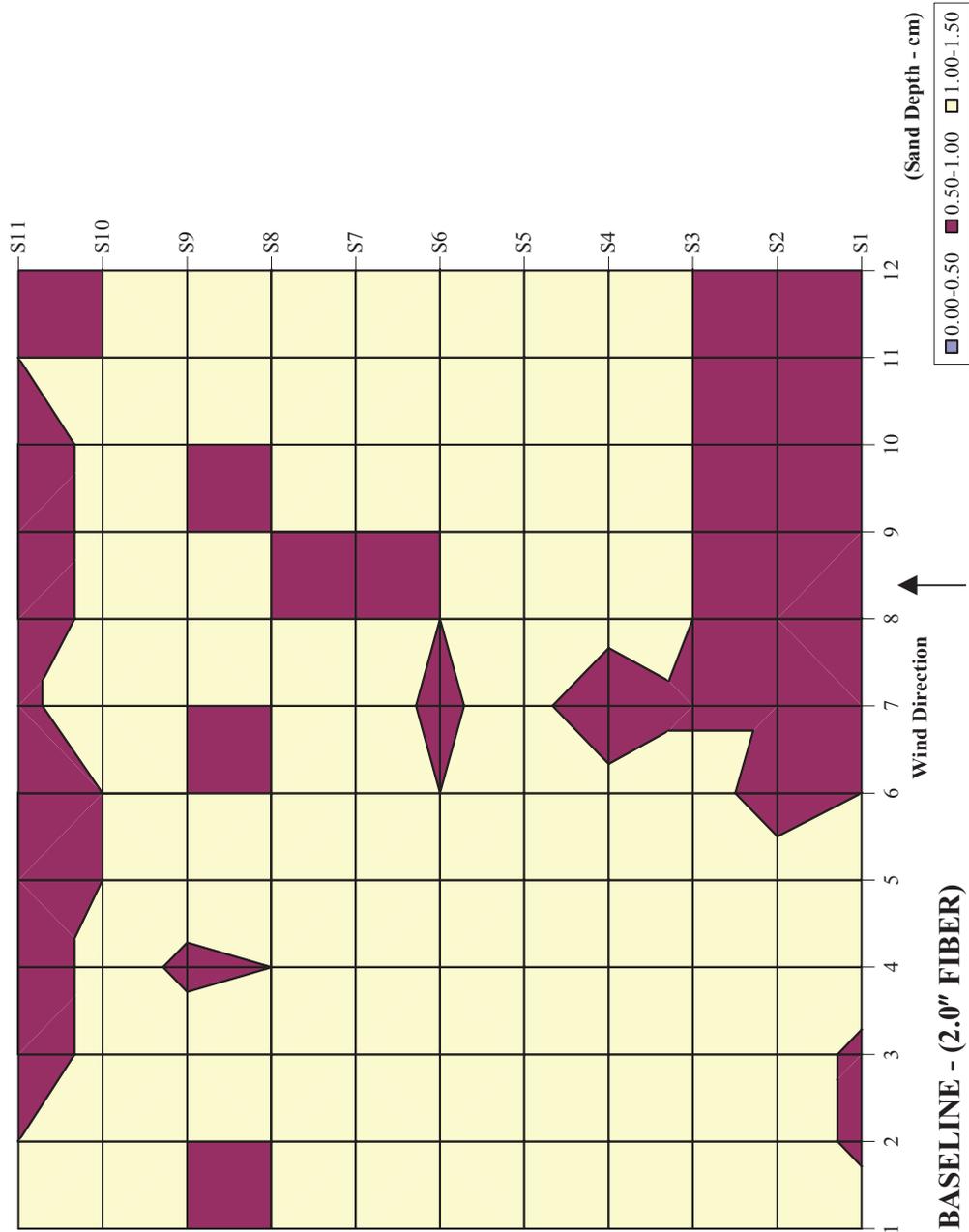
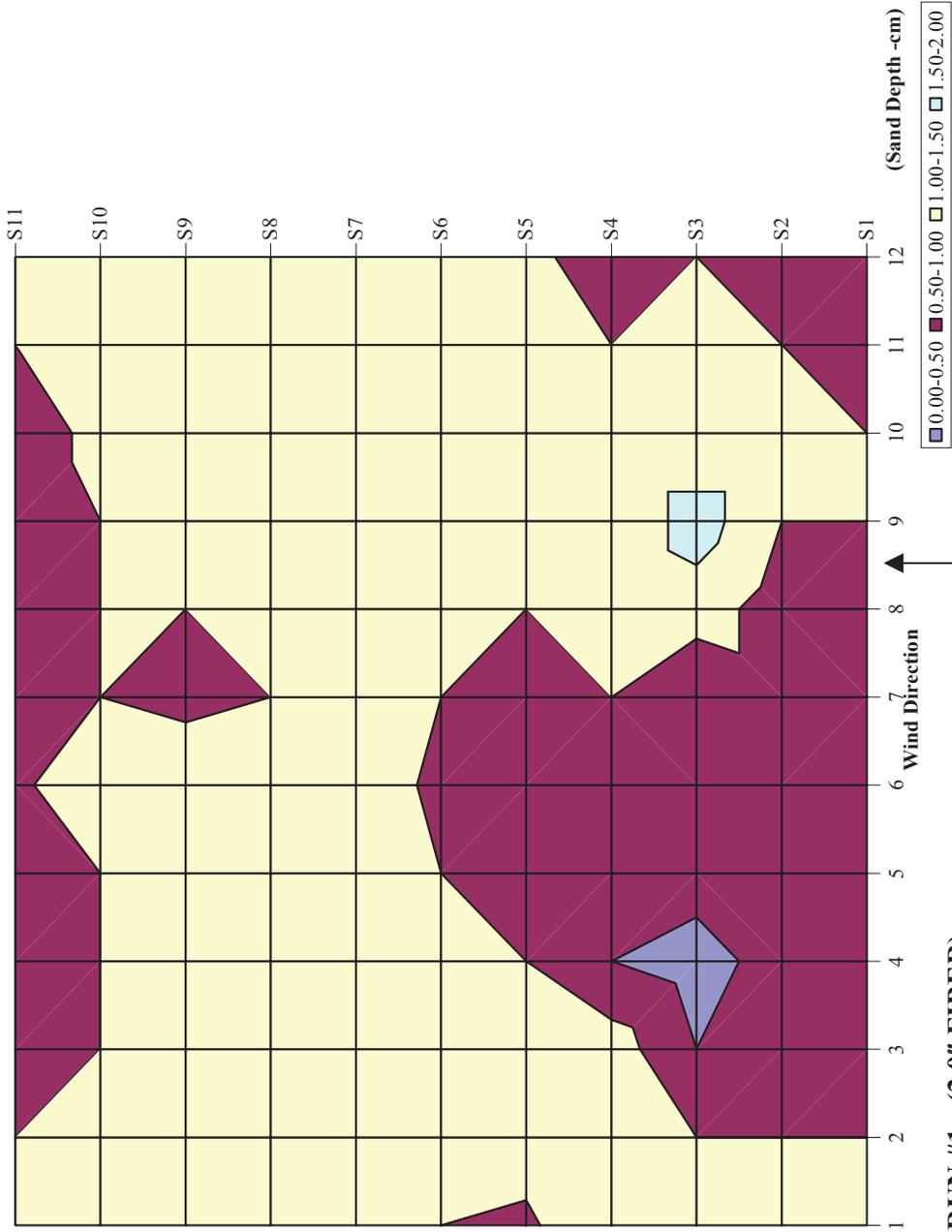


FIGURE C-5. BASELINE—1 MONTH AT 75 FEET

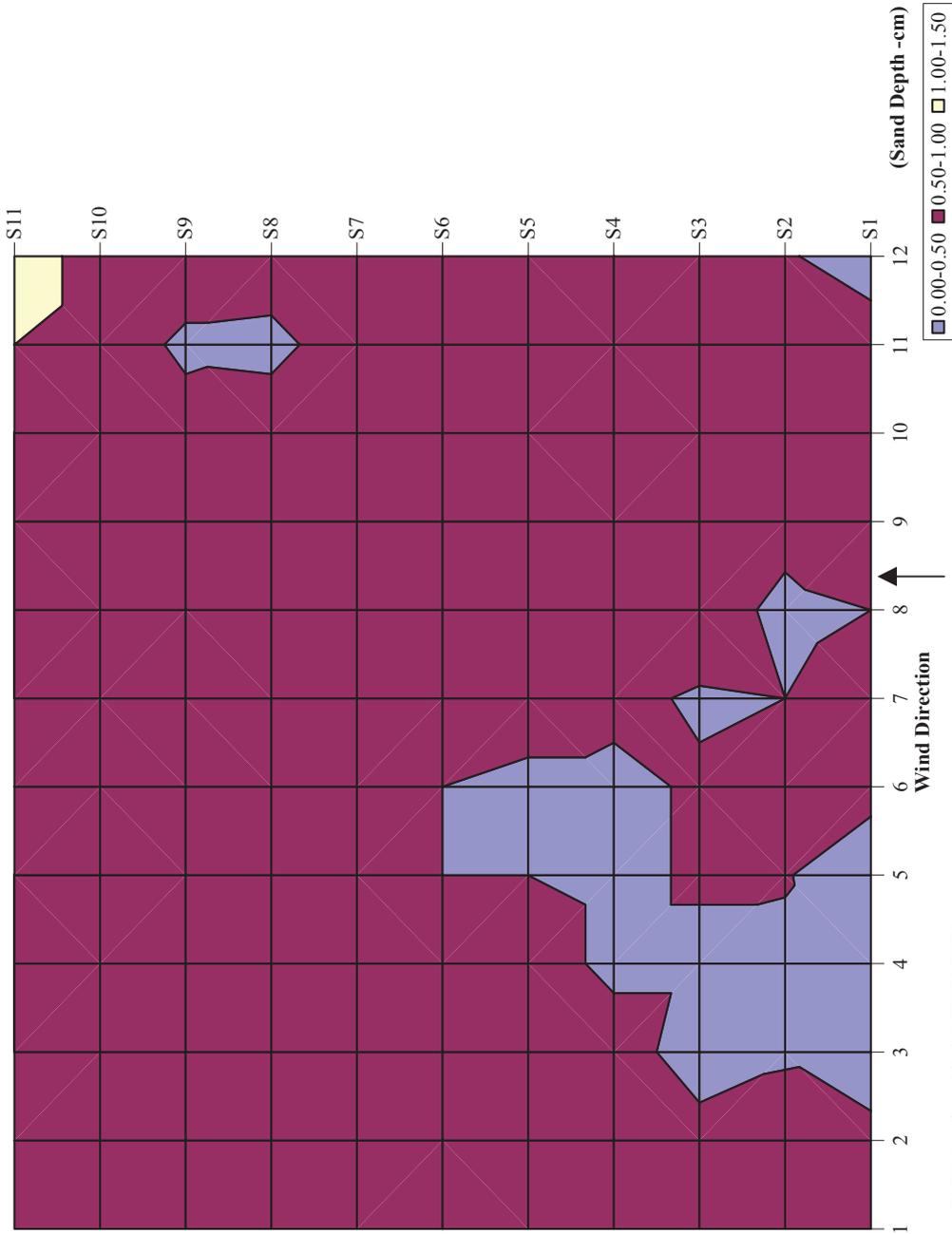
AvTurf Wind Tunnel Test 8/12/03



RUN #1 - (2.0" FIBER)

FIGURE C-6. RUN 1—1 MONTH AT 75 FEET

AvTurf Wind Tunnel Test 8/12/03



RUN #2 - (2.0" FIBER)

FIGURE C-7. RUN 2—1 MONTH AT 75 FEET

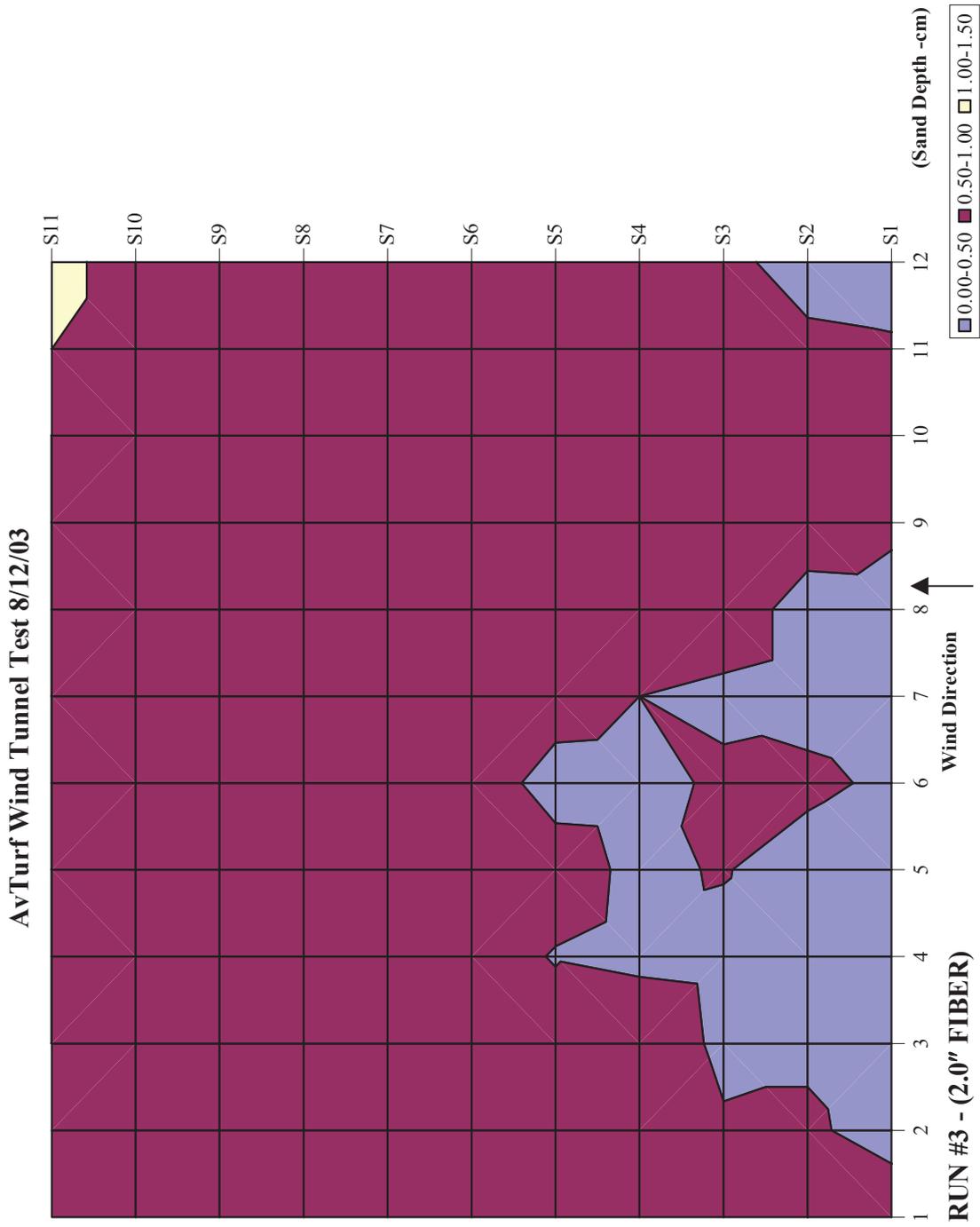


FIGURE C-8. RUN 3—1 MONTH AT 75 FEET

AvTurf Wind Tunnel Test 8/12/03

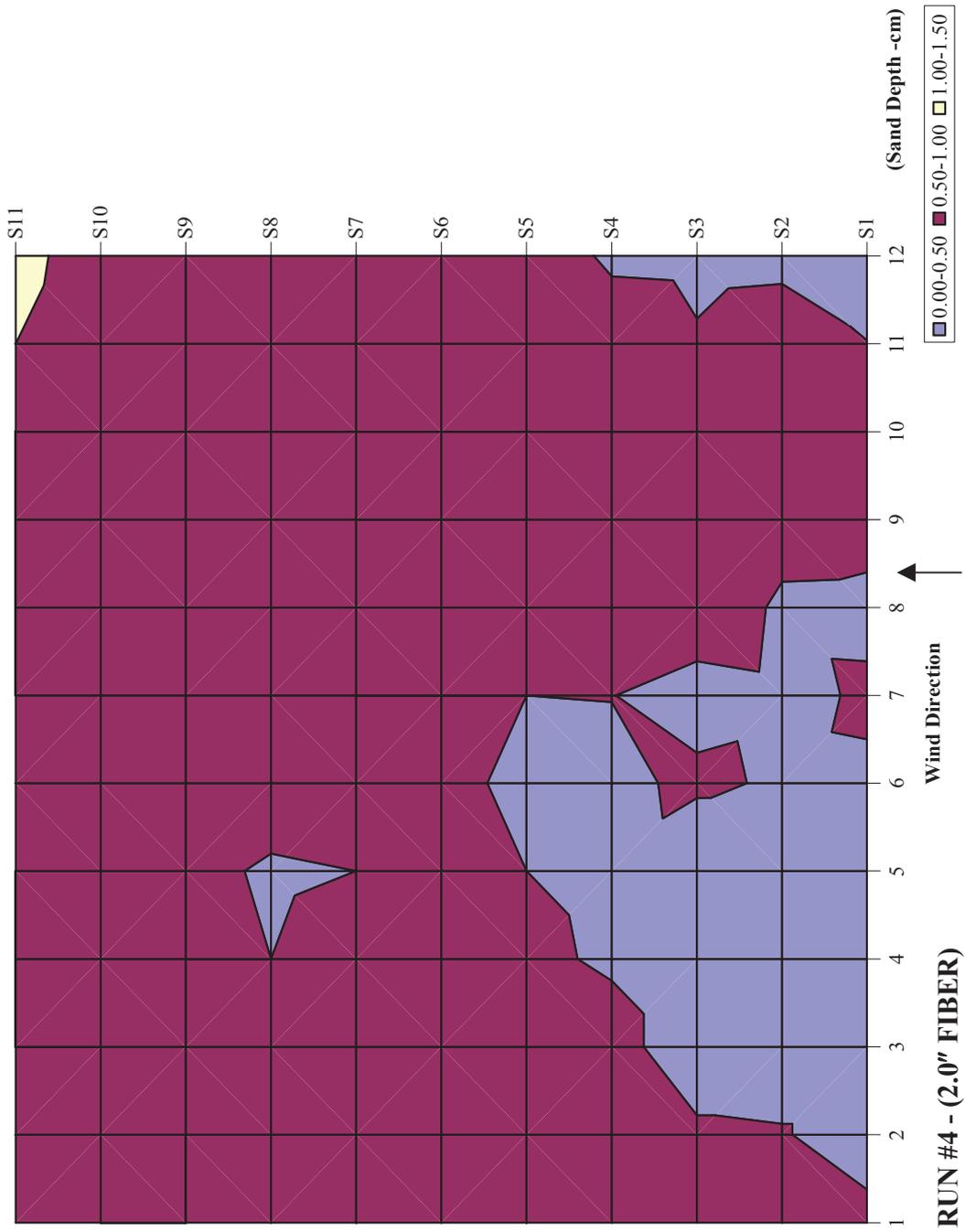
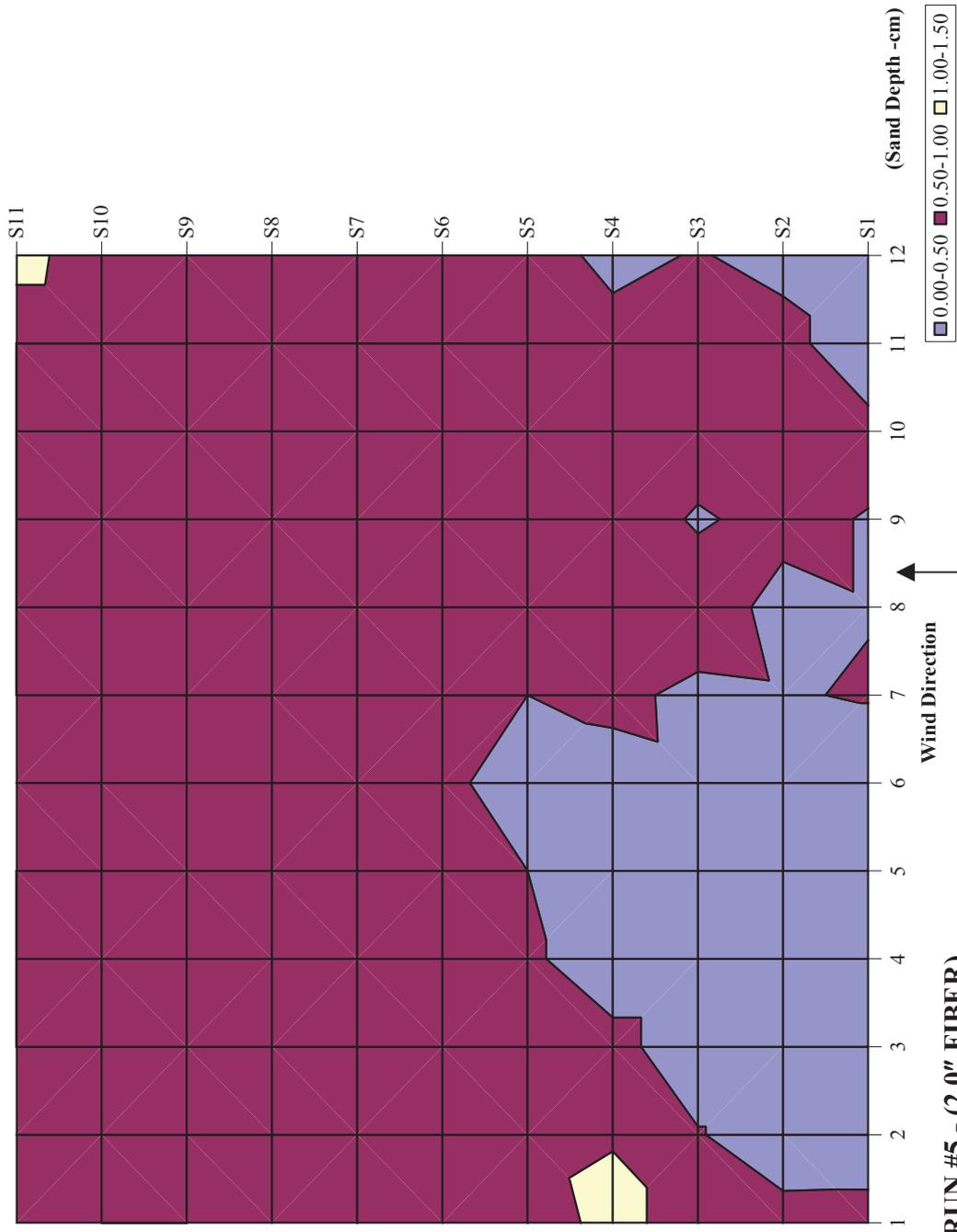


FIGURE C-9. RUN 4—1 MONTH AT 75 FEET

AvTurf Wind Tunnel Test 8/12/03



RUN #5 - (2.0" FIBER)

FIGURE C-10. RUN 5—1 MONTH AT 40 FEET

AvTurf Wind Tunnel Test 8/12/03

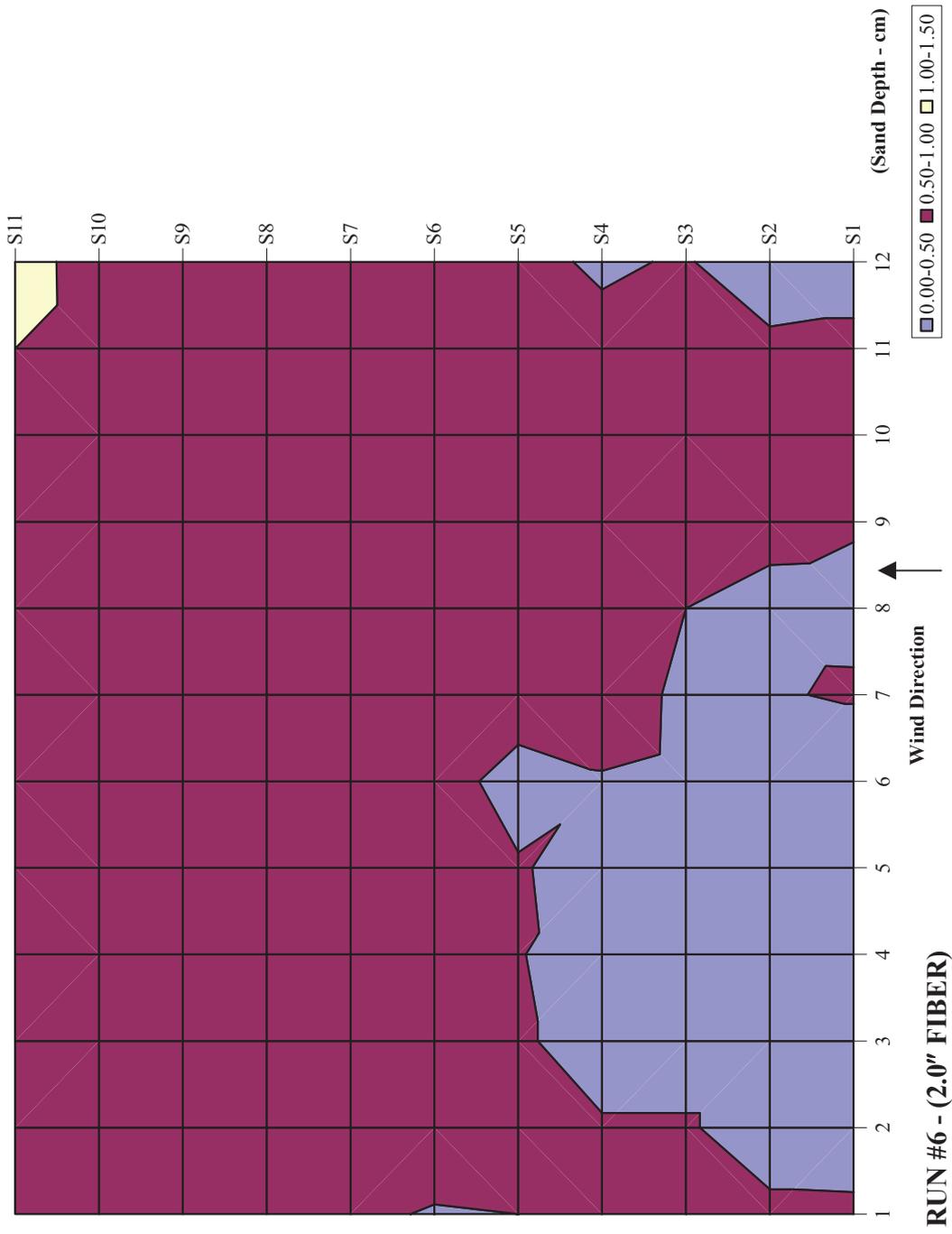
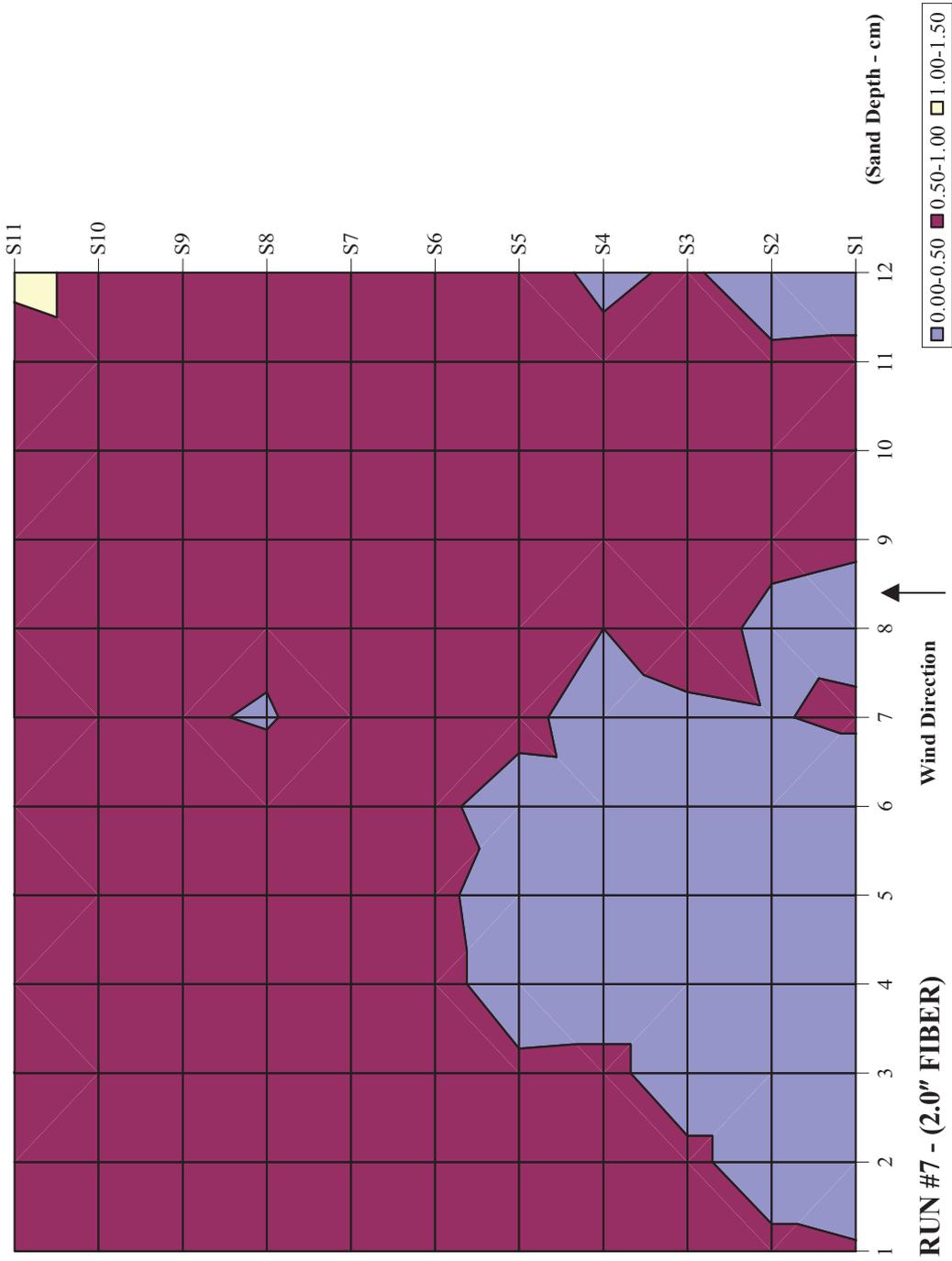


FIGURE C-11. RUN 6—1 MONTH AT 40 FEET

AvTurf Wind Tunnel Test 8/12/03



RUN #7 - (2.0" FIBER)

FIGURE C-12. RUN 7—1 MONTH AT 40 FEET

C.3.2 CONCLUSION.

It was determined that the AvTurf artificial turf product would experience heavy sand migration or removal (figures C-13 and C-14) from the artificial turf fibers between the fourth and fifth month at an airport that experienced aircraft traffic similar to LGA. It was noted that the artificial turf resonated up and down with no ballast sand. A possible explanation for the evacuation of the ballast sand is that the honeycomb fiber pattern is too wide and does not adequately trap the ballast sand.



FIGURE C-13. MEASURING CONE OUTLINE



FIGURE C-14. CONE SHAPE FROM MIGRATION OF SAND

C.4 TEST 2A—AIR FIELDTURF 2.5-INCH FIBER.

C.4.1 DESCRIPTION.

Figure C-15 shows the artificial turf used in this set of tests. The turf was divided in half perpendicularly with two different types of ballast sand. The left side of the platform contained pebble type infill about 0.25 inch in diameter. The right side of the platform contained the normal ballast sand used on previous tests. Both the pebbles and the sand infill came to the front edge of the test plot, parallel to the wind direction; a transition from pebble and sand is down the center of the test plot.

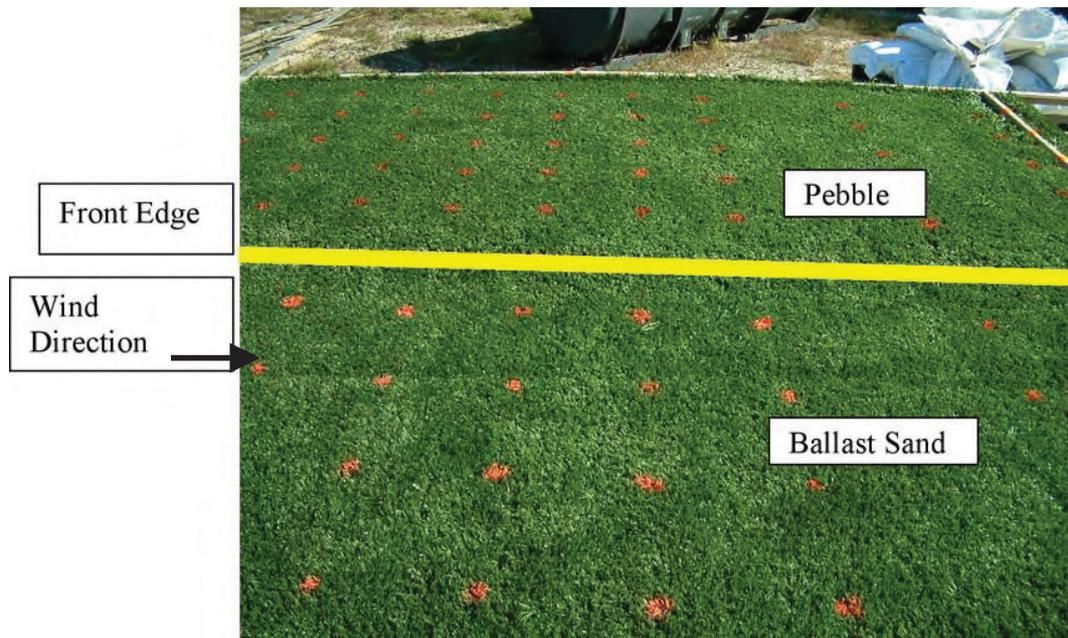


FIGURE C-15. TEST 2a—2.5-INCH FIBER TEST PLOT

Measurement points of 1 by 1 ft were marked into the turf surface to determine sand depths. A total of 7 rows and 11 columns were marked. The sixth column was the splitting point between the ballast sand infill and the pebble infill.

C.4.2 RESULTS.

It was determined that the front edge of the artificial turf was not installed correctly (figure C-16). The systems front header was exposed and was weakened due to the wind speed (figure C-17). Since the test location did not mimic an actual installation, Air FieldTurf made a modification to the plot, and tests were resumed the following day.



FIGURE C-16. TEST 2a—2.5-INCH FIBER HEADER



FIGURE C-17. TEST 2a—2.5-INCH FIBER TEST PLOT

C.5 TEST 2b—AIR FIELDTURF 2.5-INCH FIBER

C.5.1 DESCRIPTION.

The artificial turf used in this set of tests was divided in half perpendicularly with two different types of ballast sand (figure C-18). The left side of the platform contained pebble type ballast (figure C-19), about 0.25 inch in diameter. The pebble infill was used only for experimentation purposes. Air FieldTurf wanted to see if the pebble ballast would remain in the turf. Their intent was to use the pebble in noncritical areas, where there would be no chance of engine ingestion.

The right side of the platform contained the normal ballast sand used on previous tests (figure C-20). Figure C-21 shows a cross-sectional view of the 2.5-inch fiber test plot installation at the FAA William J. Hughes Technical Center wind tunnel.



FIGURE C-18. TEST 2b—2.5-INCH FIBER TEST PLOT (SECOND INSTALLATION)



FIGURE C-19. PEBBLE INFILL SIDE OF TEST PLOT



FIGURE C-20. BALLAST SAND INFILL SIDE OF TEST PLOT

Measurement points of 1 by 1 ft were marked into the turf surface to determine sand depths. A total of 7 rows and 11 columns were marked. The sixth column was the splitting point between the ballast sand infill and the pebble infill.

C.5.2 RESULTS.

- Baseline (figure C-22). The baseline depth of the pebble infill measured from 0.40 to 0.9 inch. The baseline depth of the ballast sand measured from 0.80 to 1.40 inches. The column that divided the sand and pebble measured from 0.5 to 1.0 inch.
- Run 1—1 Month at 75 feet (figure C-23). Once the test was completed, measurements were taken at the plot points on both sides. The depth of the pebble measured from 0.40 to 0.90 inch. The depth of the ballast sand measured from 0.90 to 1.45 inches. The column that divided the sand and pebble measured from 0.50 to 0.95 inch. Very minimal sand and pebble movement was noted. It was determined that the 2.5-inch fiber was successful at 75 ft.
- Run 2—1 Month at 40 feet (figure C-24). After the 75 ft test was conducted and measurements were taken, a 1-month test was conducted at 40 ft. There was no sand or pebble added to the artificial turf test plot. Once the test was completed, measurements were taken at the plot points on both sides. The depth of the pebble measured from 0.40 to 0.85 inch. The depth of the ballast sand measured from 0.8 to 1.45 inches. Very minimal sand and pebble movement was noted. It was determined that the 2.5-inch fiber was successful at 40 ft.

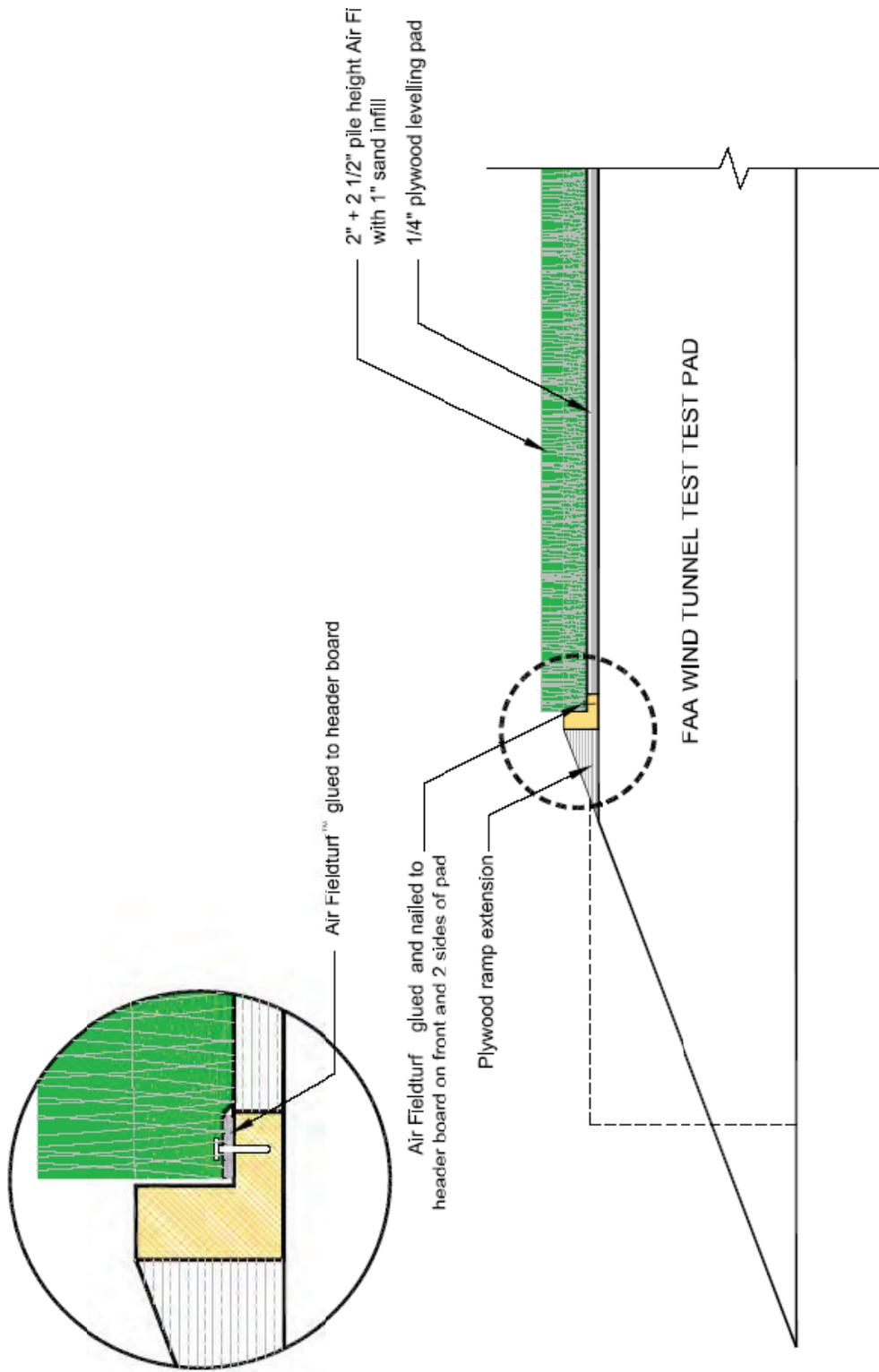


FIGURE C-21. AIR FIELDTURF ENGINEERING DRAWING FROM WIND TUNNEL, 2.5-INCH FIBER

Air FieldTurf Wind Tunnel Test 10/8/03

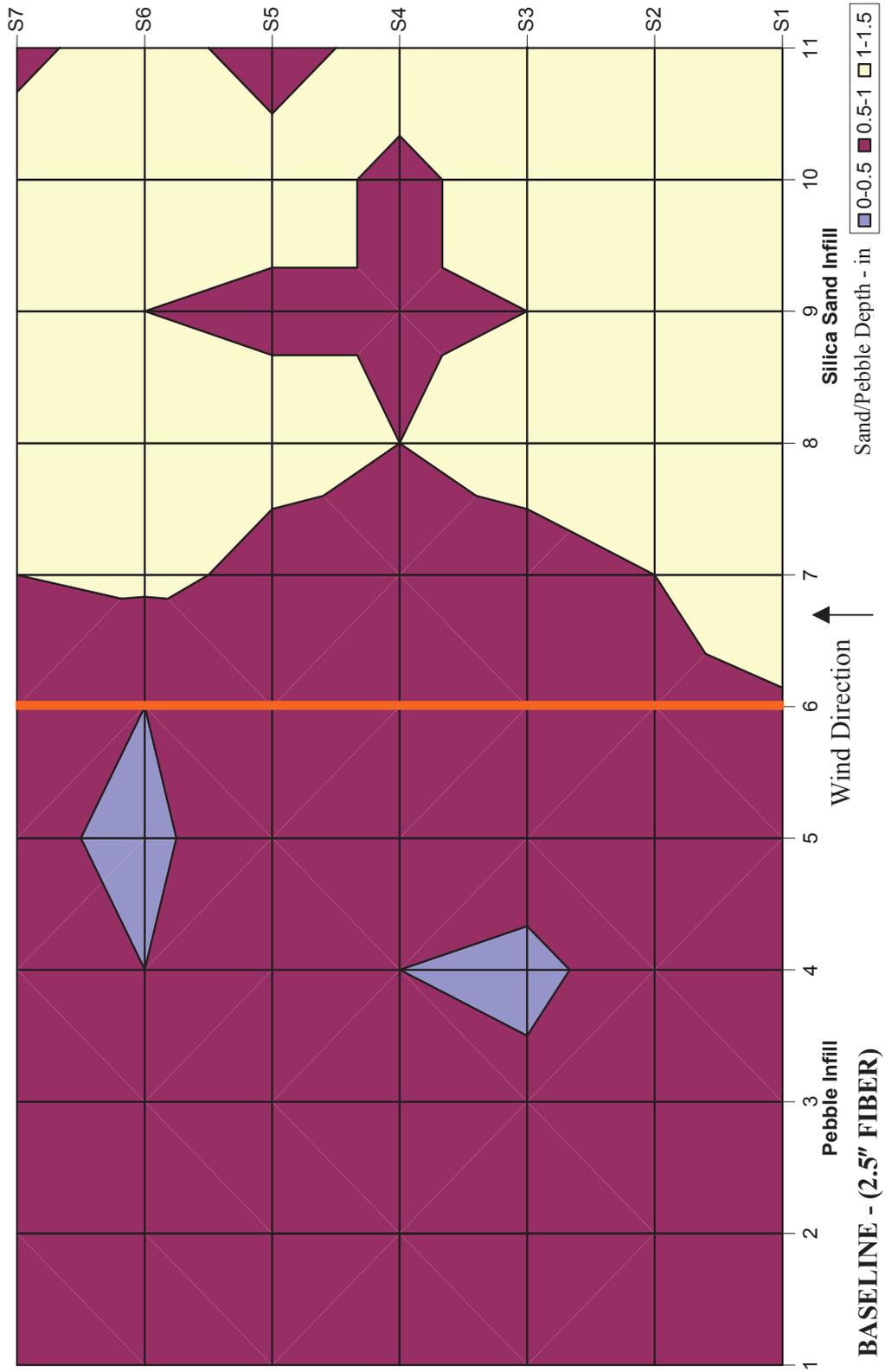
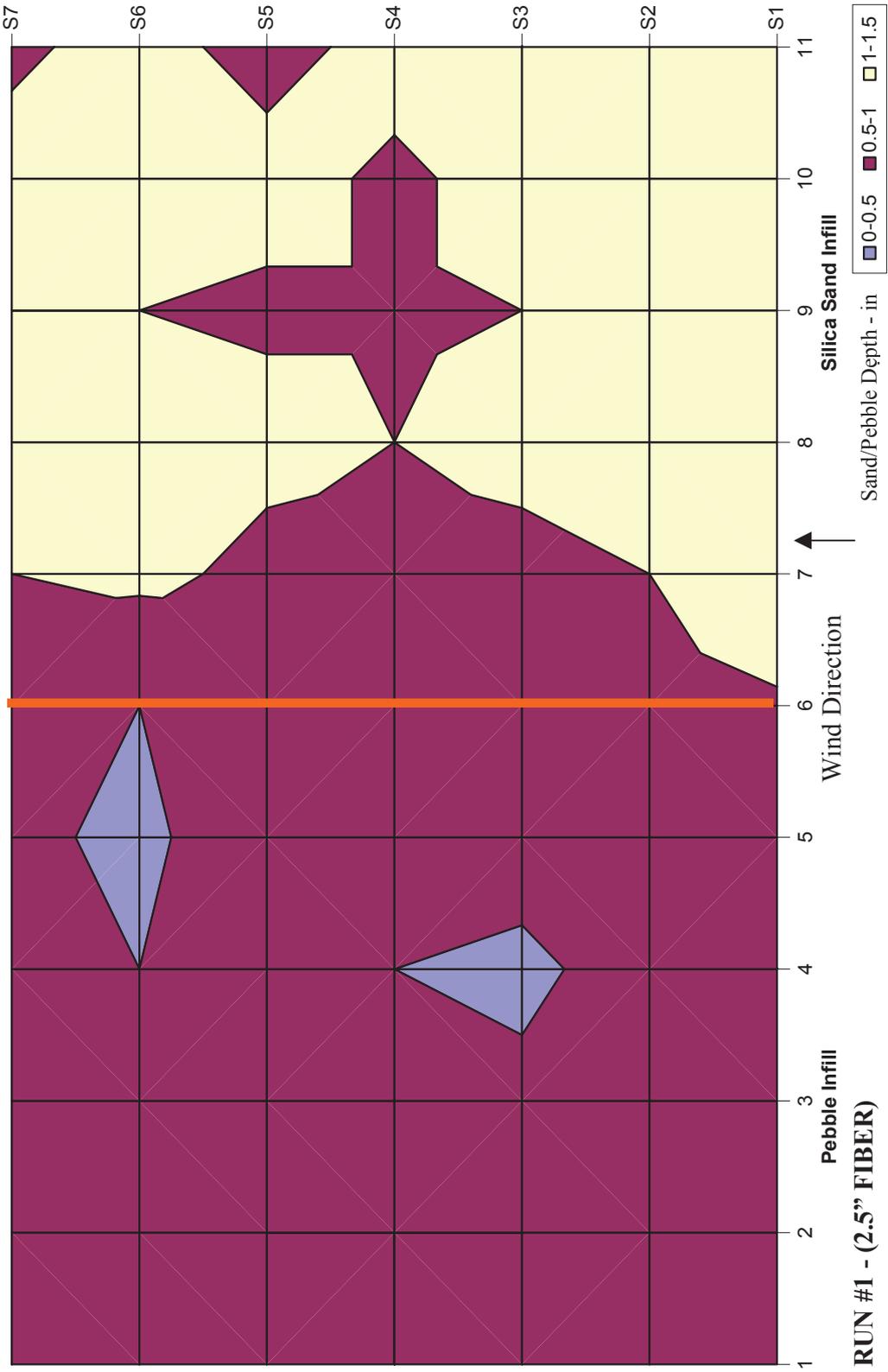


FIGURE C-22. TEST 2b—BASELINE LAYOUT

Air FieldTurf Wind Tunnel Test 10/8/03



RUN #1 - (2.5" FIBER)

FIGURE C-23. TEST 2b—RUN 1, 1 MONTH AT 75 FEET

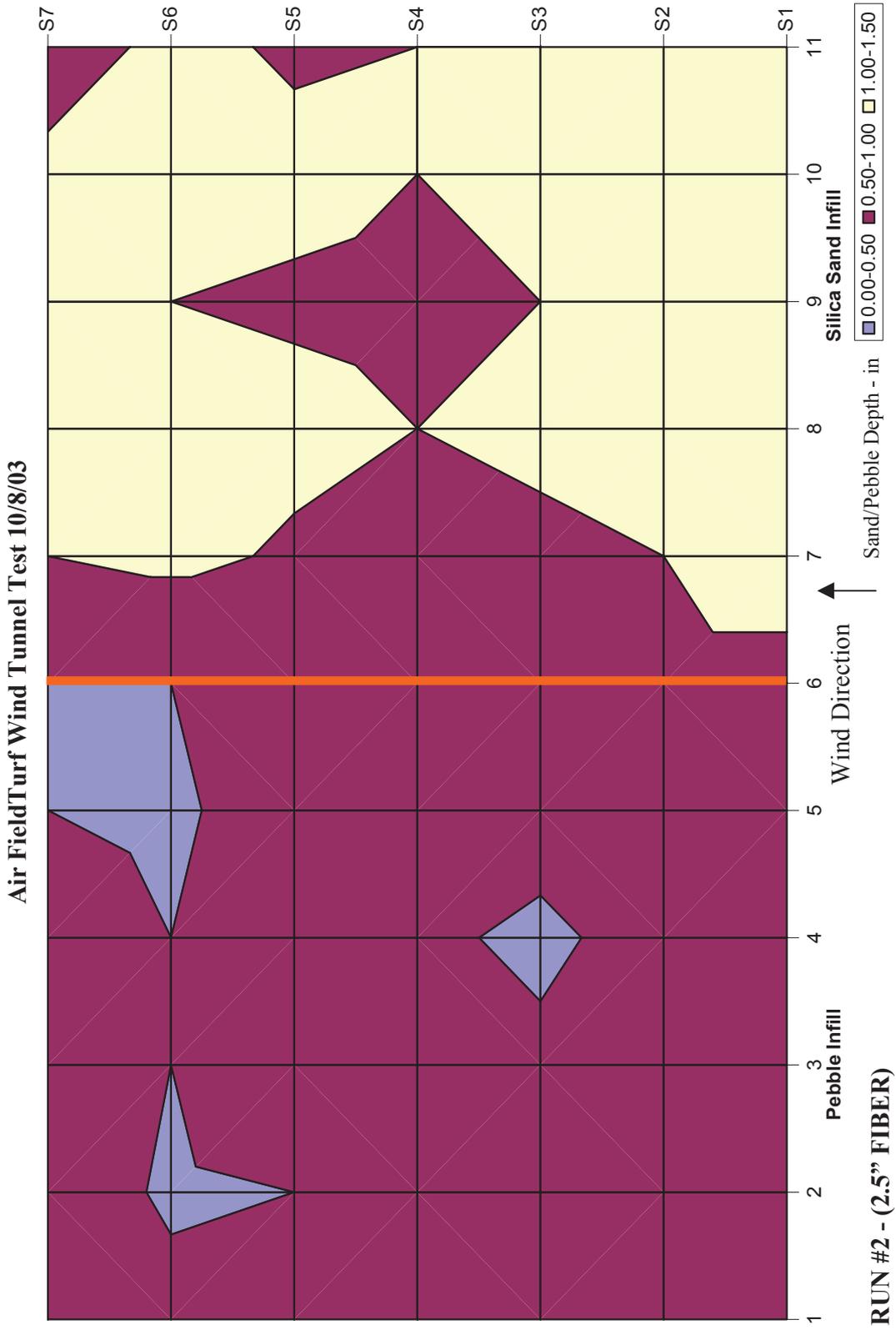


FIGURE C-24. TEST 2b—RUN 2, 1 MONTH AT 40 FEET

C.6 TEST 3—AIR FIELDTURF 2.0-INCH FIBER.

C.6.1 DESCRIPTION.

The artificial turf used in this set of tests was divided in half perpendicularly with two different types of ballast sand (figure C-25). The left side of the platform contained a pebble type infill, about 0.25 inch in diameter. The right side of the platform contained the normal ballast sand used on previous tests.



FIGURE C-25. TEST 3—2.0-INCH FIBER TEST PLOT

Measurement points of 1 by 1 ft were marked into the turf surface to determine sand depths. A total of 7 rows and 11 columns were marked. The sixth column was the splitting point between the ballast sand infill and the pebble infill. Figure C-26 shows a cross-sectional view of the 2.0-inch fiber test plot installation at the wind tunnel.

C.6.2 RESULTS.

- Baseline (figure C-27). The baseline sand depth of the pebble measured from 0.70 to 1.10 inches. The baseline depth of the ballast sand measured from 0.70 to 1.20 inches.
- Run 1—1 Month at 75 ft (figure C-28). Once the test was completed, measurements were taken at the plot points on both sides. The depth of the pebble measured from 0.55 to 1.00 inch. The depth of the ballast sand measured from 0.70 to 1.10 inches. The column that divided the sand and pebble measured from 0.65 to 1.0 inch. Very minimal sand and pebble movement was noted. It was determined that the 2.0-inch fiber was successful at 75 ft.

- Run 2—1 Month at 40 ft (figure C-29). After the 75-ft test was conducted and measurements were taken, a 1-month test was conducted at 40 ft. There was no sand or pebble added to the artificial turf test plot. Once the test was completed, measurements were taken at the plot points on both sides. The depth of the pebble measured from 0.70 to 1.20 inches. The depth of the ballast sand measured from 0.65 to 1.10 inches. Very minimal sand and pebble movement was noted. It was determined that the 2.0-inch fiber was successful at 40 ft.

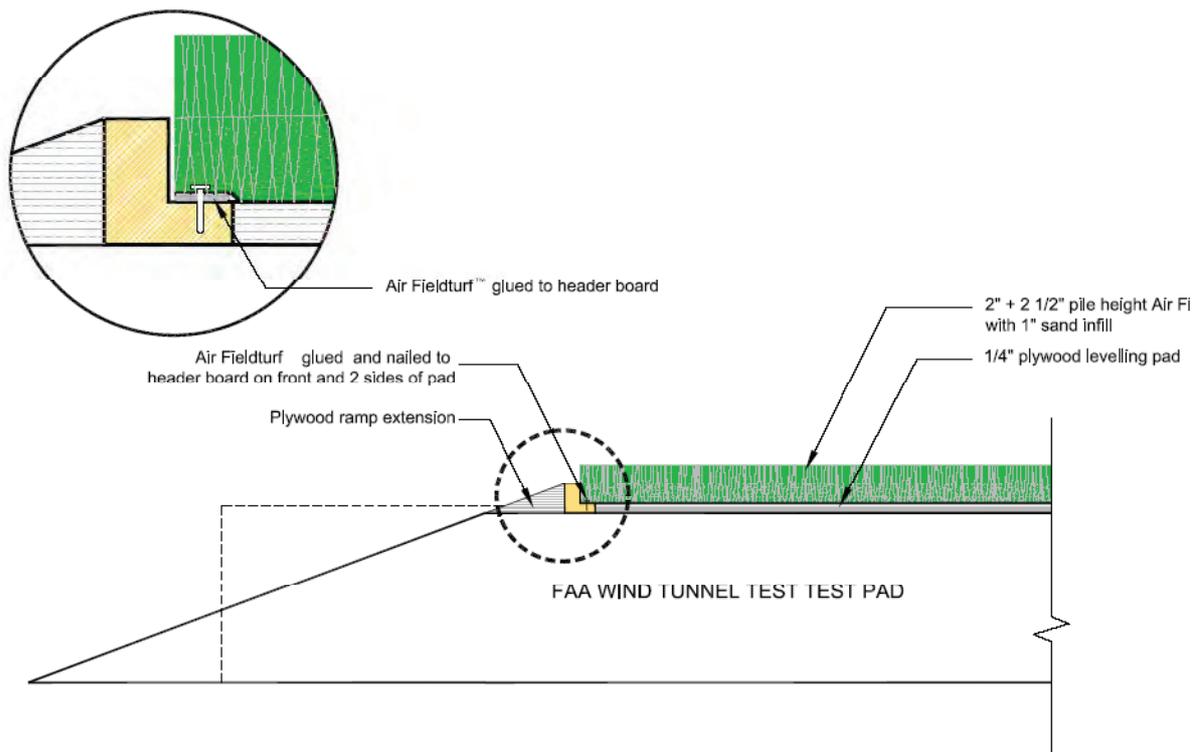


FIGURE C-26. AIR FIELDTURF ENGINEERING DRAWING FROM WIND TUNNEL
2.0-INCH FIBER

Air FieldTurf Wind Tunnel Test 10/9/03

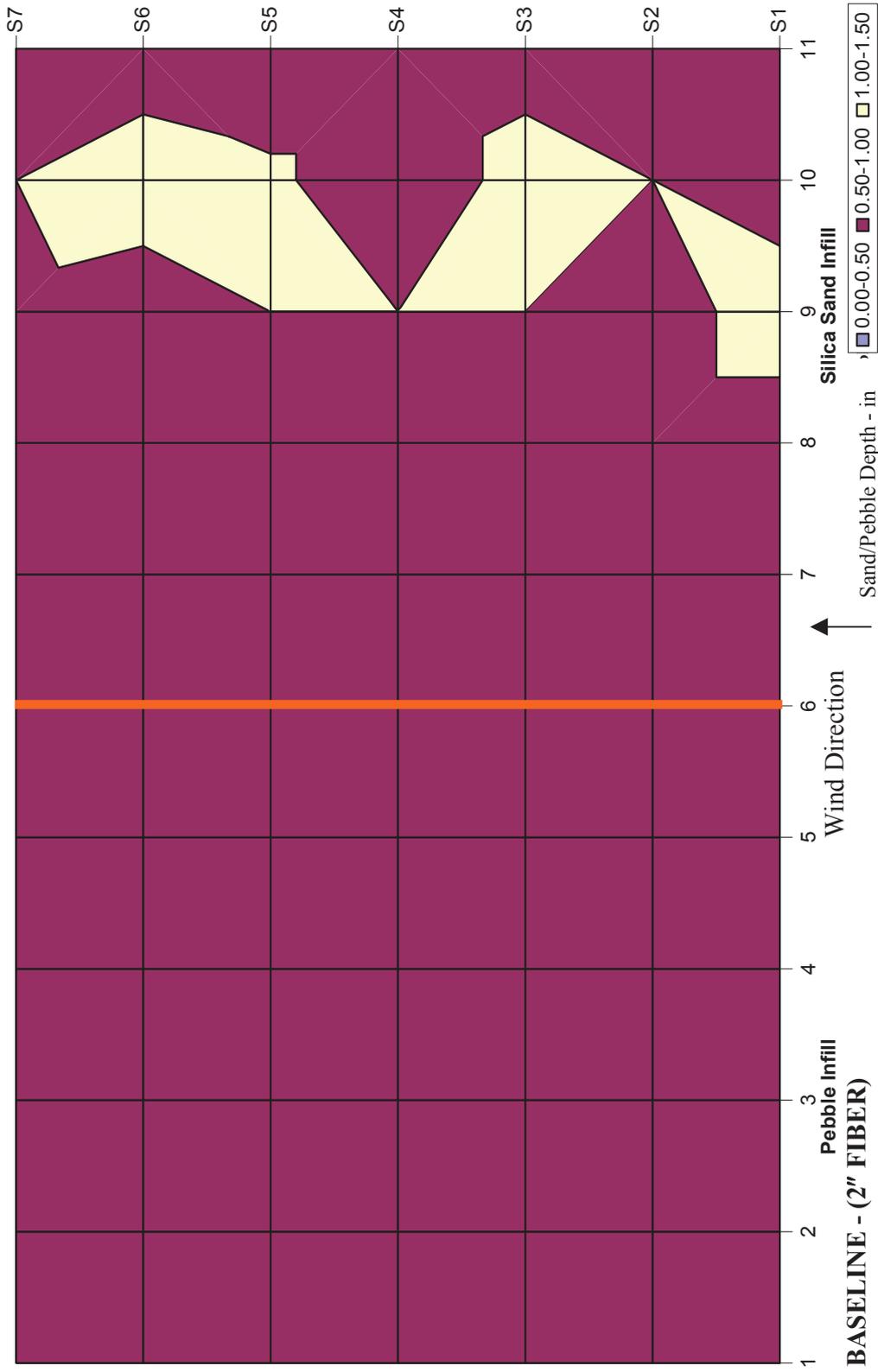


FIGURE C-27. TEST 3—BASELINE LAYOUT

Air FieldTurf Wind Tunnel Test 10/9/03

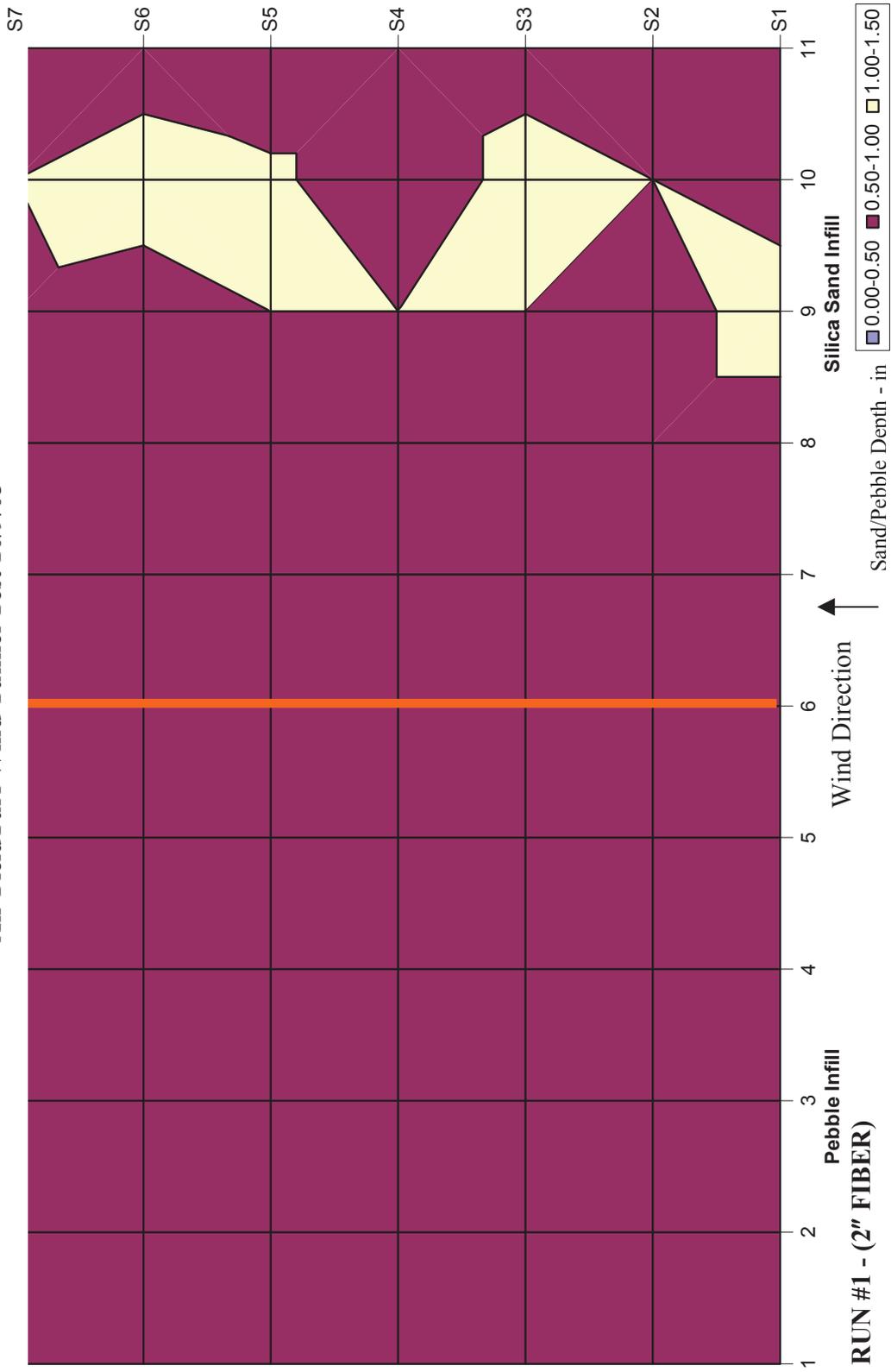


FIGURE C-28. TEST 3—RUN 1, 1 MONTH AT 75 FEET

C.7 TEST 4—AIR FIELDTURF 1.0-INCH FIBER.

C.7.1 DESCRIPTION.

An experiment was conducted to determine how short a fiber length could be and still retain the ballast sand (figure C-30). A test was performed on a 1-inch fiber at 75 ft from the runway to determine how the artificial turf fibers retained the ballast sand.



FIGURE C-30. THE 1.0-INCH TEST PLOT

Measurement points of 1 by 1 ft were marked into the turf surface to determine sand depths. A total of 3 rows and 7 columns were marked. Figure C-31 shows a cross-sectional view of the 1.0-inch fiber test plot installation at the wind tunnel.

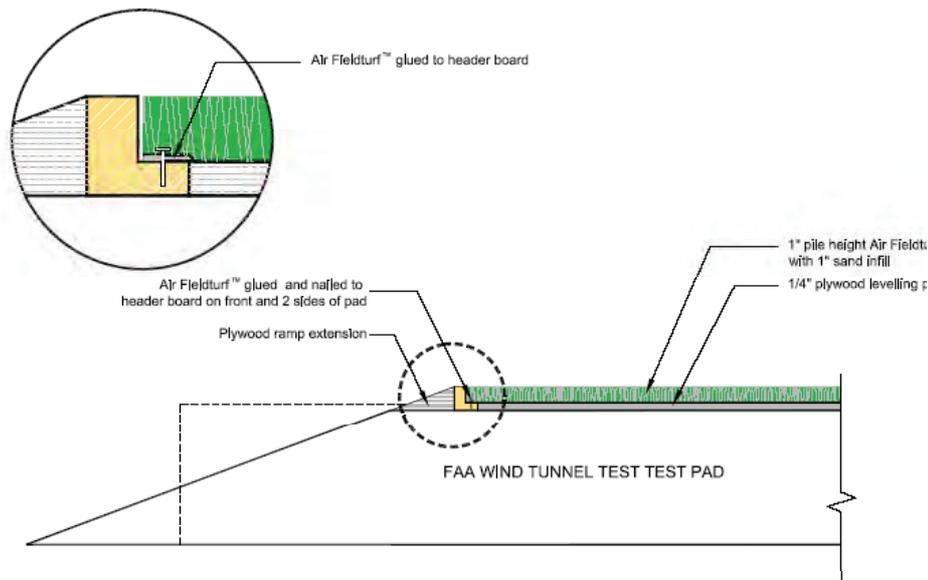


FIGURE C-31. AIR FIELDTURF ENGINEERING DRAWING FROM WIND TUNNEL, 1.0-INCH FIBER

C.7.2 RESULTS.

After the first few cycles of test one it became evident that the fiber was too short to retain any of the ballast sand (figure C-32). The 1-inch fiber was determined to be unsuccessful.



FIGURE C-32. TEST 4—1.0-INCH FIBER TEST PLOT

C.8 TEST 5—AIR FIELDTURF 1.5-INCH FIBER.

C.8.1 DESCRIPTION.

The test was performed at 75 ft from the runway to determine how the artificial turf fibers retained the ballast sand (figures C-33 and C-34). Measurement points of 1 by 1 ft were marked into the turf surface to determine sand depths; a total of 3 rows and 7 columns were marked.



FIGURE C-33. TEST 5—1.5-INCH FIBER TEST PLOT



FIGURE C-34. TEST 5—1.5-INCH FIBER TEST PLOT AFTER TESTS

Note: When measuring the baseline depths of ballast sand, it was discovered that the right most portion of the test plot (rows 5-7) were frozen. Once the test was performed, the frozen areas thawed, thus allowing for a more accurate depth reading.

C.8.2 RESULTS.

- Baseline (figure C-35). The baseline depth of the ballast sand measured from 0.75 to 1.30 inches. Rows 6-7 were frozen, so no measurements were recorded.
- Run 1—1 Month at 75 ft (figure C-36). Once the test was completed, measurements were taken at the plot points. The depth of the ballast sand measured from 0.70 to 1.40 inches. Very minimal sand movement was noted. It was determined that the 1.5-inch fiber was successful for 1 month at 75 ft.
- Run 2—1 Month at 75 ft (figure C-37). A second 1-month test was performed at 75 ft to determine if the 1.5-inch artificial turf fibers would no longer retain the ballast sand. No sand was added to the turf. Once the test was completed, measurements were taken at the plot points. The depth of the ballast sand measured from 0.50 to 1.25 inches. Very minimal sand movement was noted. It was determined that the 1.5-inch fiber was successful for a second 1-month test at 75 ft. Figure C-38 shows a cross-sectional view of the 1.5-inch fiber test plot installation at the wind tunnel.

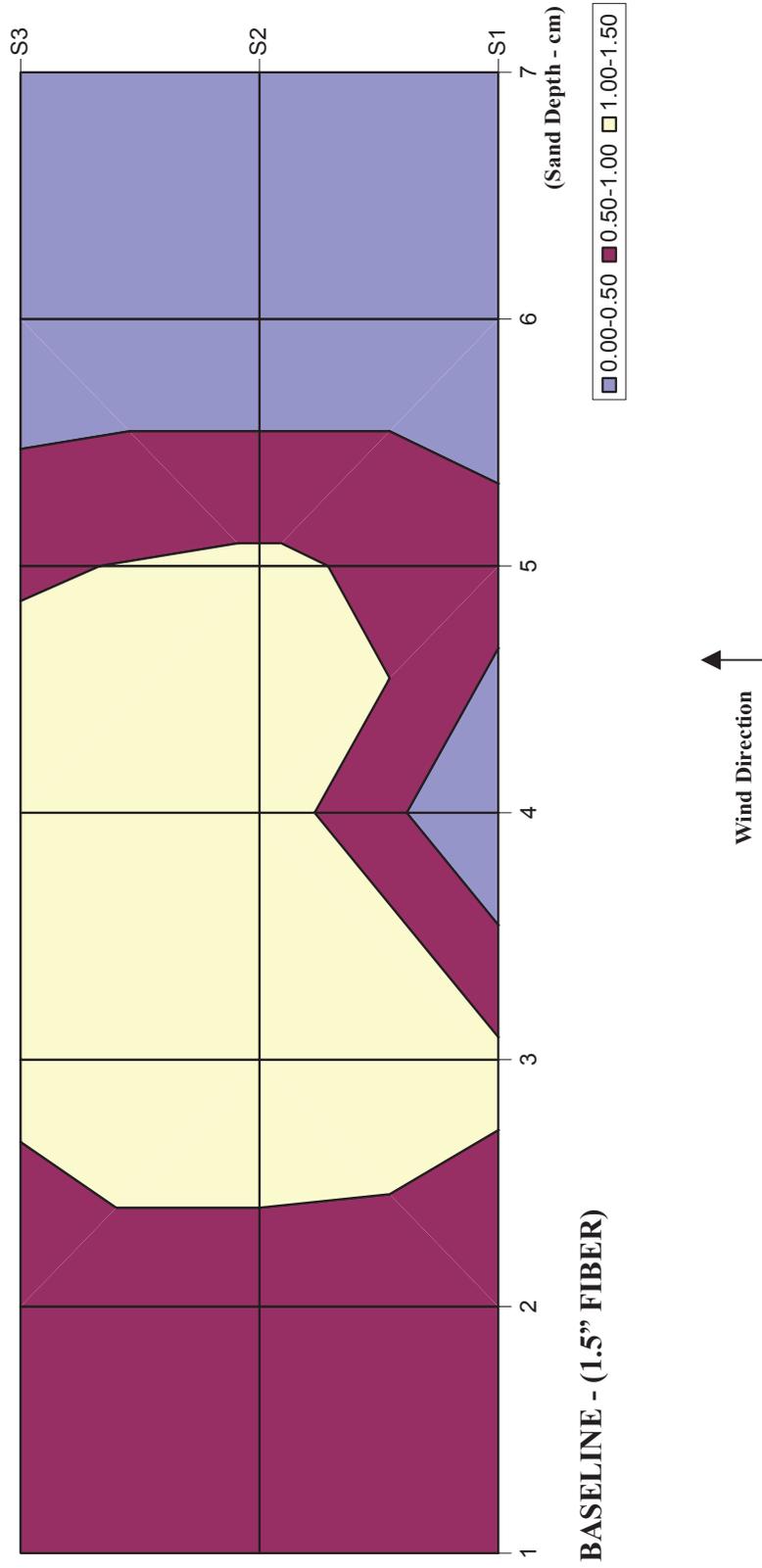
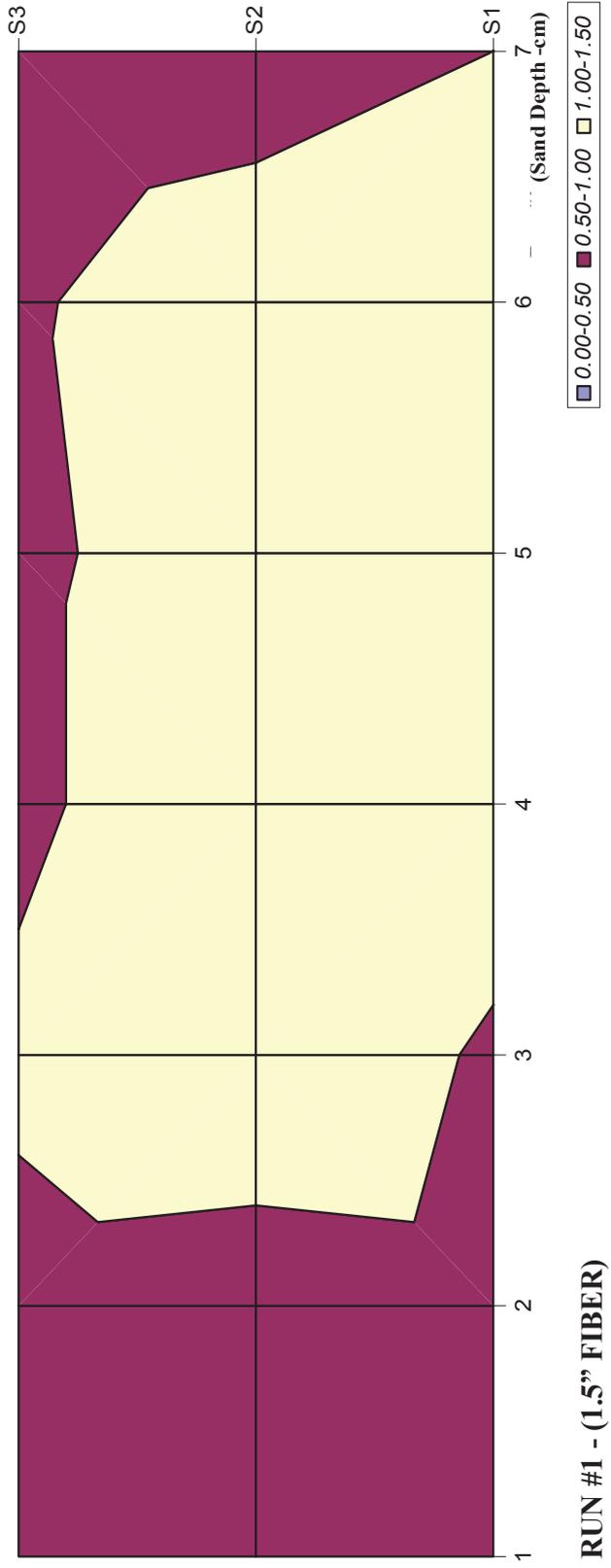


FIGURE C-35. TEST 5—BASELINE LAYOUT

Air FieldTurf Wind Tunnel Test 02/04/04



Wind Direction ↑

FIGURE C-36. TEST 5—RUN 1, 1 MONTH AT 75 FEET

Air FieldTurf Wind Tunnel Test 02/04/04

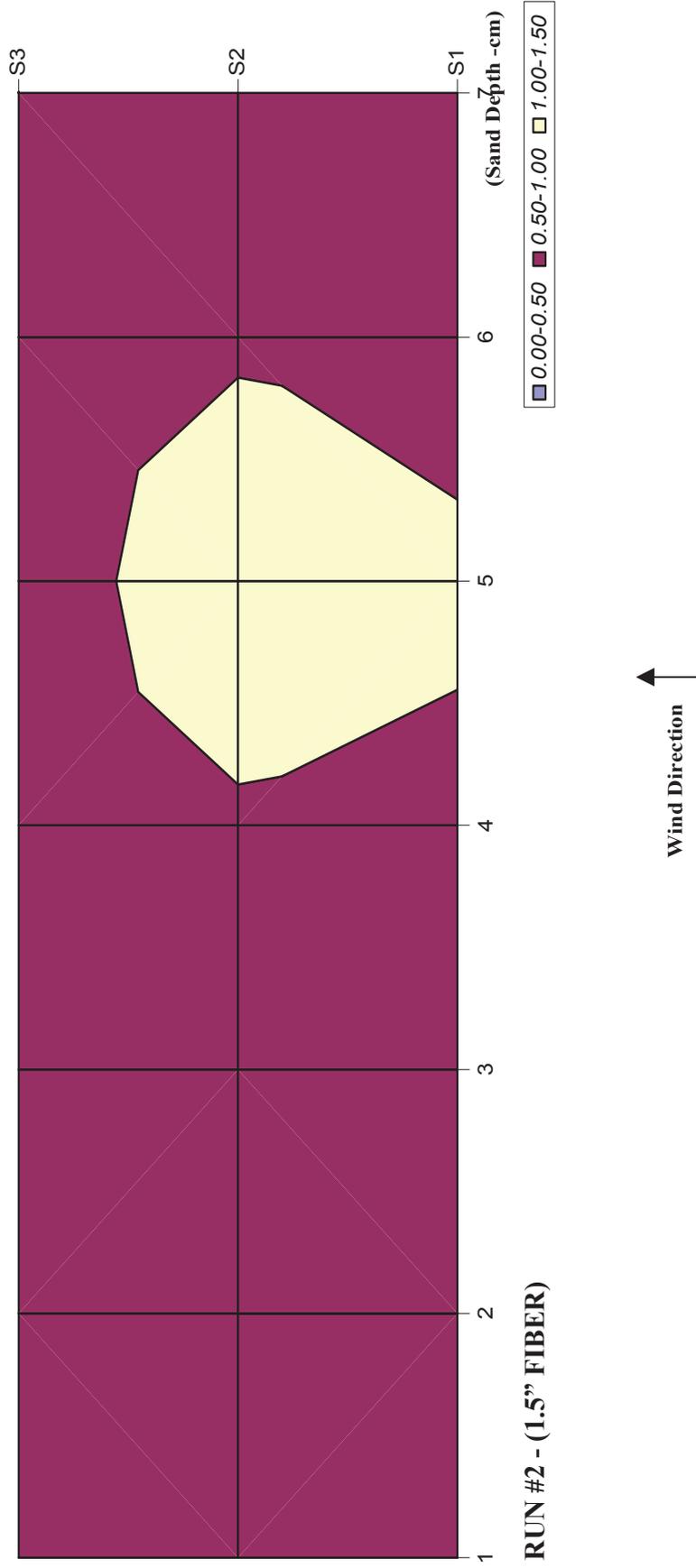


FIGURE C-37. TEST 5—RUN 2, 1 MONTH AT 75 FEET

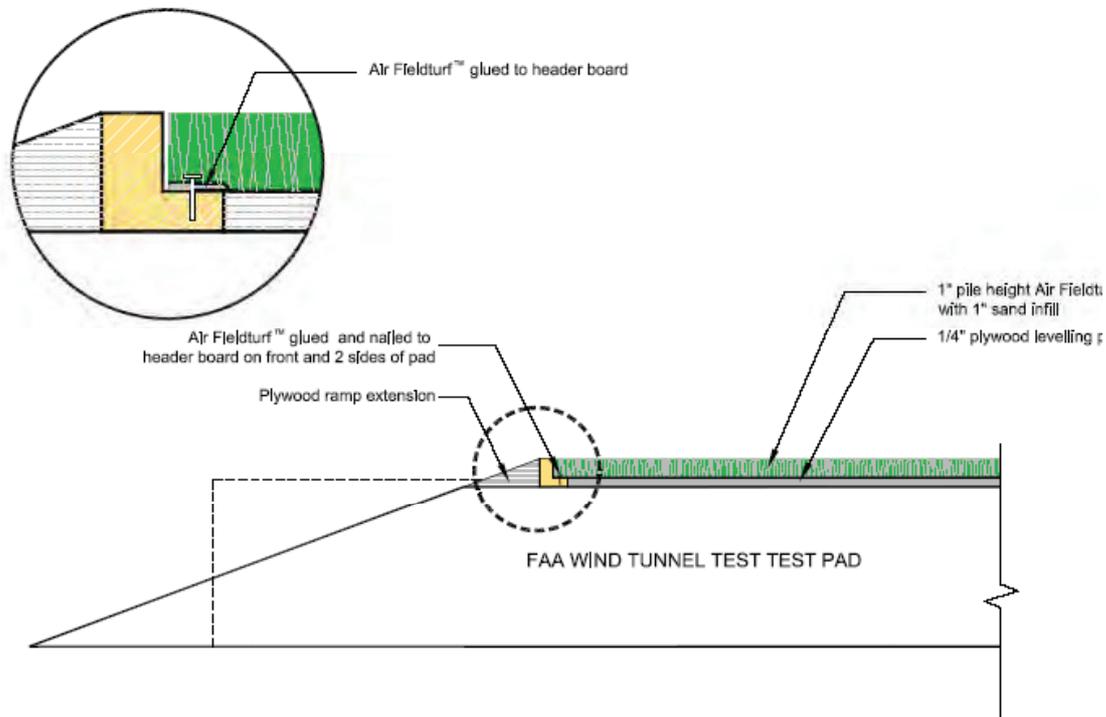


FIGURE C-38. AIR FIELDTURF ENGINEERING DRAWING FROM WIND TUNNEL, 1.5-INCH FIBER

C.9 TEST 6—AIR FIELDTURF 2.0-INCH FIBER GLUED TO CONCRETE SURFACE (NO INFILL).

To test the glued concrete application for the artificial turf, a 12- by 12-ft concrete slab 4 inches thick was poured on top of the existing test pad (figure C-39). Once the concrete was dried, the surface was acid washed with an industrial-grade citric acid. After the acid wash was complete, the concrete pad was scored with two 2-inch-deep lines across the test pad. The artificial turf that was glued to the concrete did not have any sand infill; the purpose of the wind tunnel test was to check the ability of the glue to hold the artificial turf in place during high wind speeds. The glued artificial turf application had two different header systems along the front edge of the test pad; each header was 6 ft wide, dividing the pad in the half. On the left side of the pad, a quick-drying concrete header was set up (figure C-40). On the right side of the pad, a flexible rubber header was attached to the turf (figure C-41).

A seven-cycle test at 40 ft was conducted to check the adhesion of the glue to the concrete and artificial turf. After the cycles were completed, the turf was checked by pulling up on the turf to see if it was still adhered to the concrete. It was determined that the glue would hold the turf, but a long-term analysis must be done to see how the glue holds up over time.



FIGURE C-39. APPLICATION OF ARTIFICIAL TURF TO CONCRETE



FIGURE C-40. THE 2.0-INCH FIBER WITH QUICK-DRYING CONCRETE HEADER



FIGURE C-41. THE 2.0-INCH FIBER WITH RUBBER HEADER

C.10 TEST 7—AIR FIELDTURF 2.0-INCH FIBER GLUED TO CONCRETE SURFACE (WITH INFILL).

C.10.1 DESCRIPTION.

A 16-cycle test was conducted to experiment with the ballast sand infill for the concrete surface glued application (figure C-42). The purpose of the test was to determine if the ballast sand would remain in the turf glued to the surface, as opposed to the turf installation being even with the ground.



FIGURE C-42. THE 2.0-INCH FIBER TEST PLOT

Measurement points of 1 by 1 ft were marked into the turf surface to determine sand depths; a total of 3 rows and 11 columns were marked (figures C-43 and C-44). Figures C-45 and C-46 show a cross-sectional view of the 2.0-inch fiber test plot with the two different headers installed at the wind tunnel.



FIGURE C-43. TEST 7—2.0-INCH FIBER TEST PLOT AFTER TESTS



FIGURE C-44. TEST 7—2.0-INCH FIBER TEST PLOT AFTER TESTS, CLOSE-UP

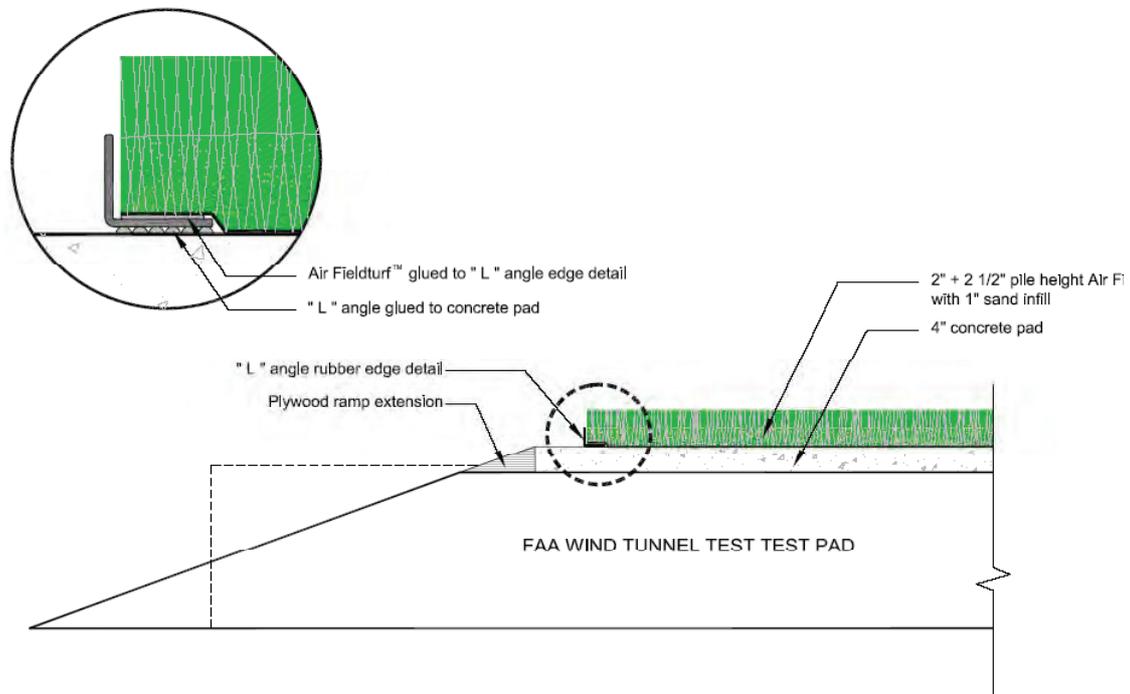


FIGURE C-45. AIR FIELDTURF ENGINEERING DRAWING FROM GLUE DOWN TEST, 2.0-INCH FIBER WITH L ANGLE EDGE

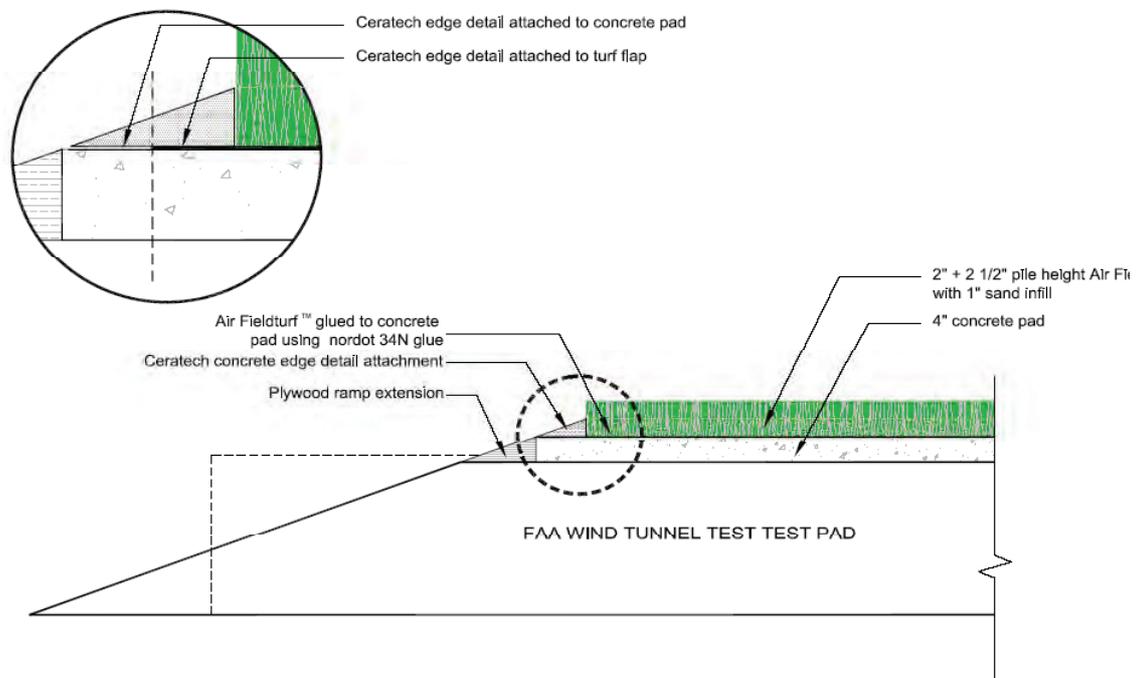


FIGURE C-46. AIR FIELDTURF ENGINEERING DRAWING FROM GLUE DOWN TEST, 2.0-INCH FIBER WITH CERATECH EDGE

C.10.2 RESULTS.

- Baseline (figure C-47). The baseline depth of the ballast sand measured from 0.75 to 1.30 inches.
- Run 1—Eight cycles at 40 ft (figure C-48). Once the test was completed, measurements were taken at the plot points. The depth of the ballast sand measured from 0.40 to 1.35 inches. Very minimal sand movement was noted. It was determined that the glued 2.0-inch fiber was successful for eight cycles at 45 ft.
- Run 2—Eight cycles at 40 ft (figure C-49). A second eight-cycle test was performed at 40 ft to determine if the 2.0-inch glued artificial turf fibers would no longer retain ballast sand. No sand was added to the turf. Once the test was completed, measurements were taken at the plot points. The depth of the ballast sand measured from 0.50 to 1.25 inches. Very minimal sand movement was noted. It was determined that the 2.0-inch fiber was successful for the second eight-cycle test at 40 ft.

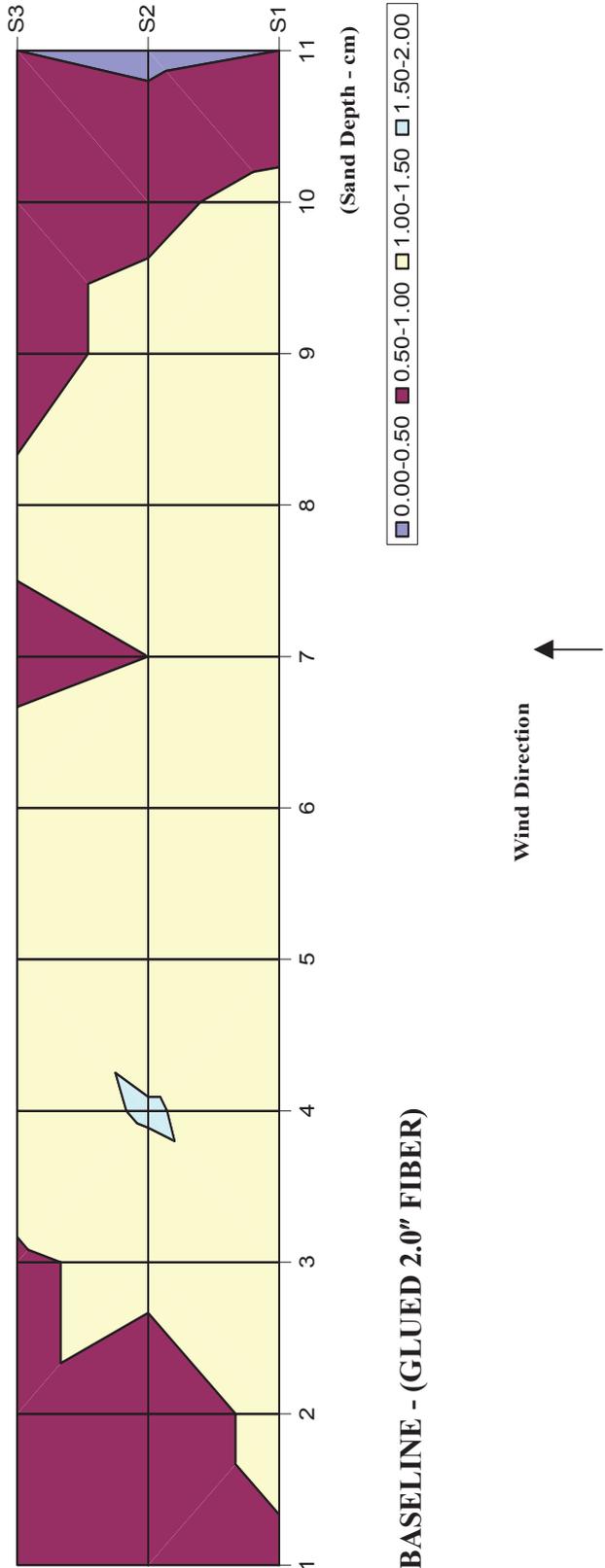


FIGURE C-47. TEST 7—BASELINE LAYOUT

Air FieldTurf Wind Tunnel Test 03/010/04

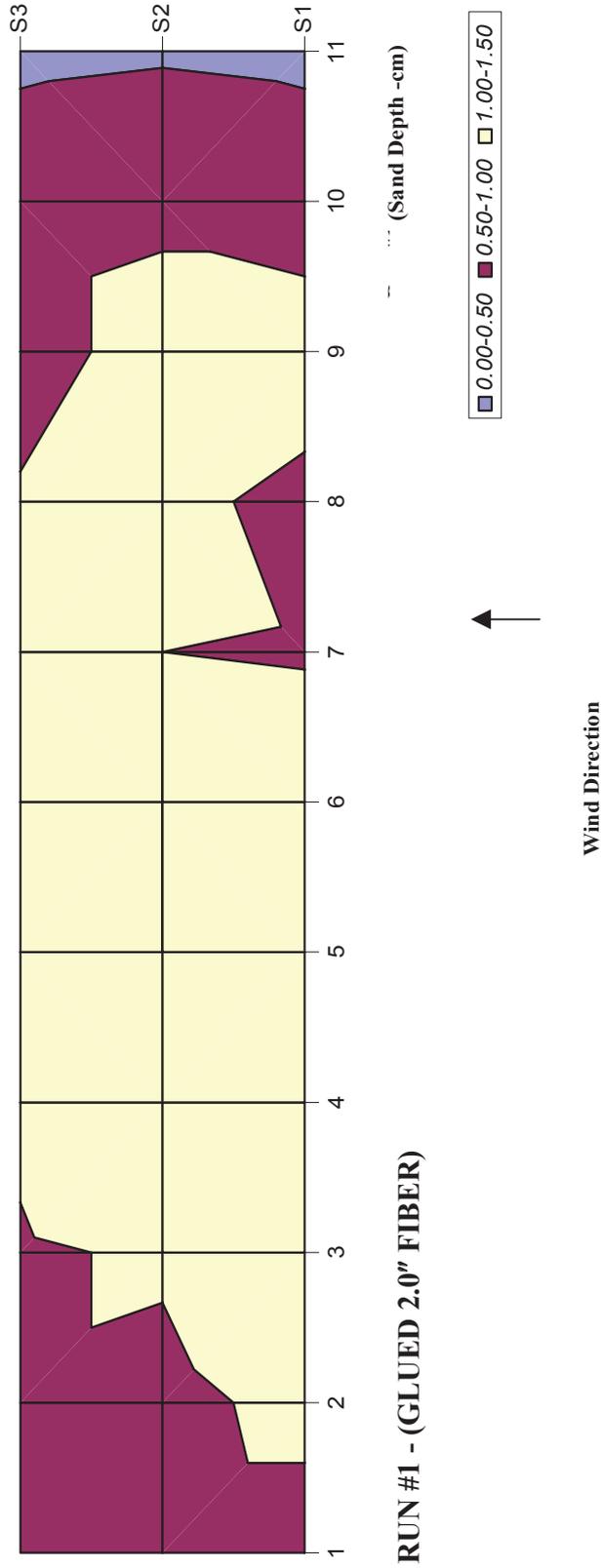


FIGURE C-48. TEST 7—RUN 1, EIGHT CYCLES AT 40 FEET

Air FieldTurf Wind Tunnel Test 03/010/04

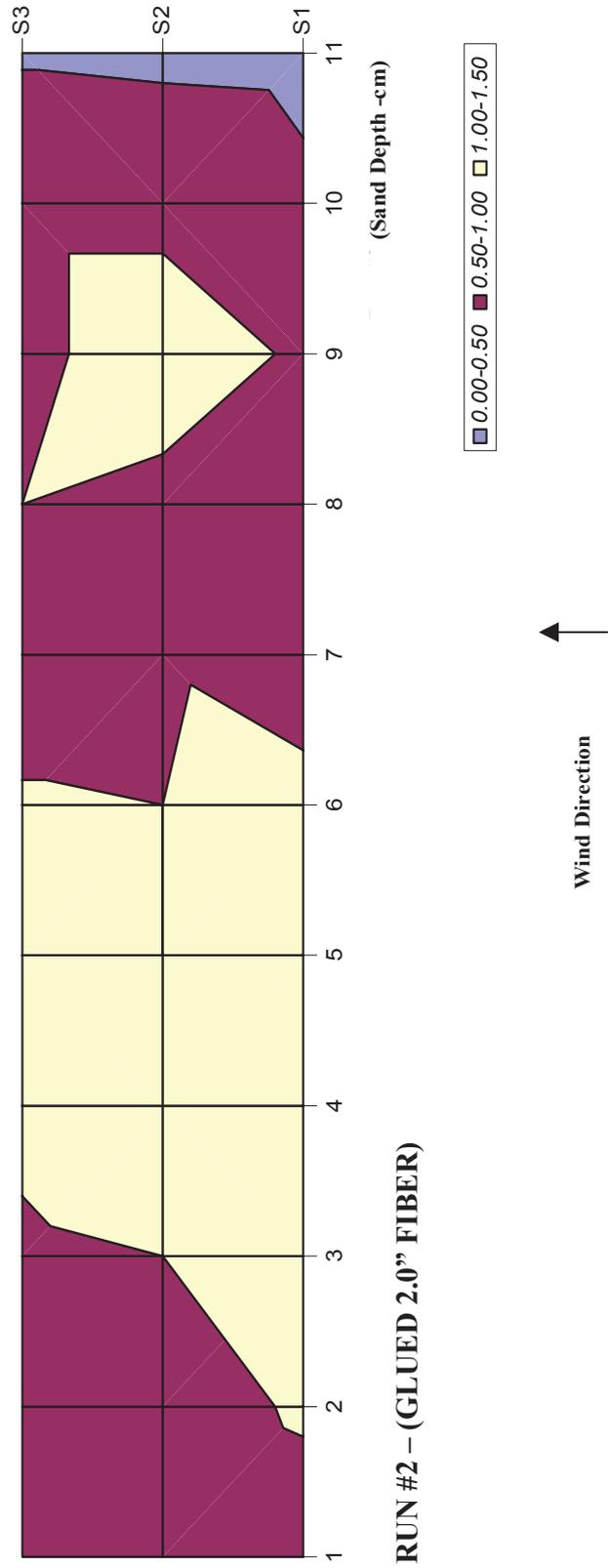


FIGURE C-49. TEST 7—RUN 2, EIGHT CYCLES AT 40 FEET

C.11 TEST 8—AIR FIELDTURF 1.5-INCH FIBER.

C.11.1 DESCRIPTION.

The original 1.5-inch fiber test plot installation only covered half the test pad and was tested at 75 ft from the runway (figure C-50). A test cycle was conducted with the installation covering the entire test plot at 40 ft from the runway.



FIGURE C-50. THE 1.5-INCH FIBER TEST PLOT

Measurement points of 1 by 1 ft were marked into the turf surface to determine sand depths; a total of 5 rows and 11 columns were marked. (Figure C-38 shows a cross-sectional view of the 1.5-inch fiber test plot installation at the wind tunnel.)

C.11.2 RESULTS.

- Baseline (figure C-51). The baseline depth of the ballast sand measured from 0.40 to 0.80 inch.
- Run 1—Four cycles at 40 ft (figure C-52). The test was conducted at the 40-ft profile. During the course of the testing, it was noted that sand was being significantly removed from the artificial turf. After the fourth cycle was completed, the testing was stopped to conduct a visual inspection of the sand evacuation. It was determined that on the right side of the centerline, there was no sand remaining in a five-column space. The left side of the centerline experienced minimal sand movement. The depth of the ballast sand on the left side of the centerline measured from 0.50 to 0.80 inch (figures C-53 and C-54).

Air FieldTurf Wind Tunnel Test 03/011/04

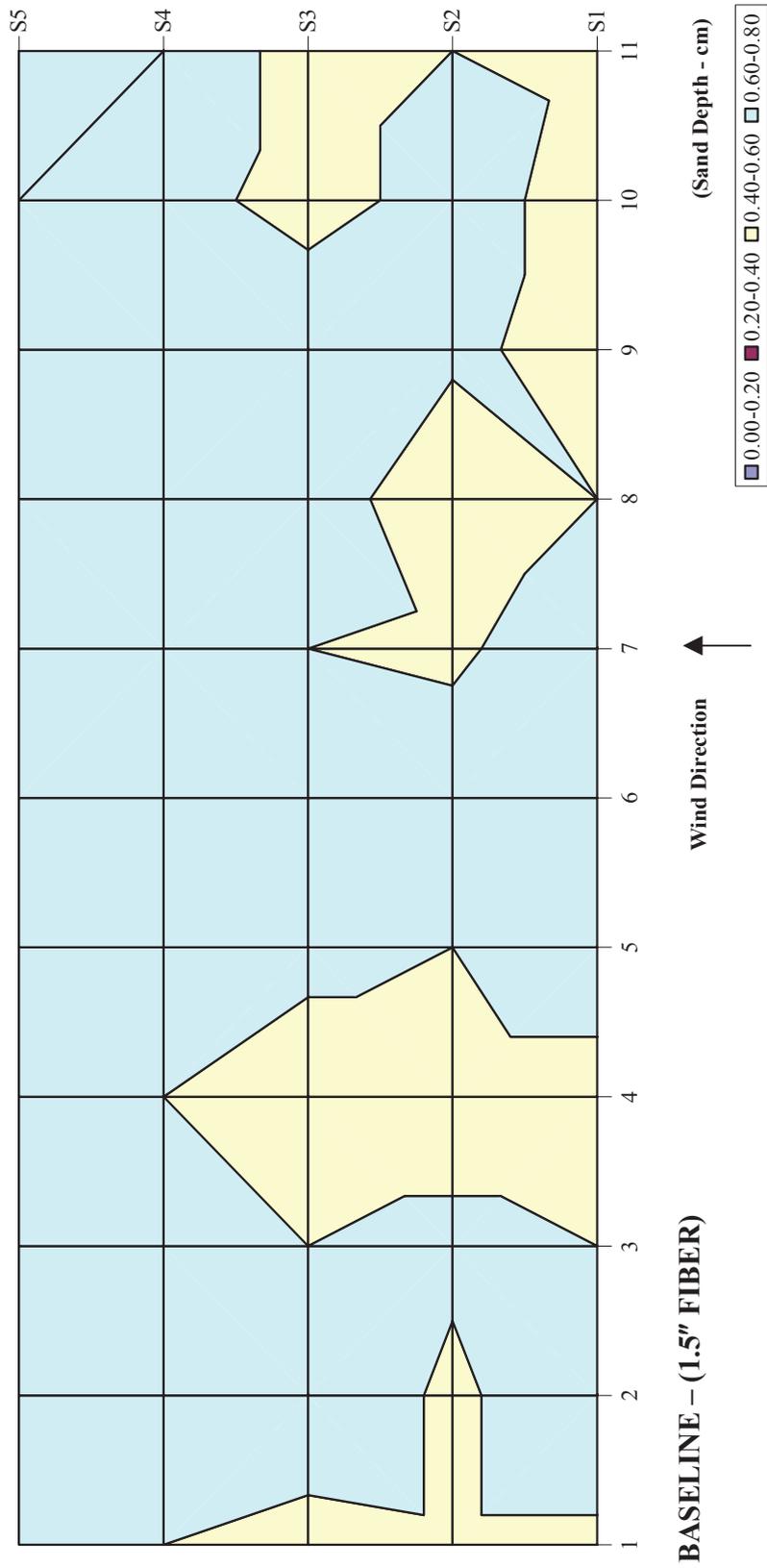


FIGURE C-51. TEST 8—BASELINE LAYOUT

Air FieldTurf Wind Tunnel Test 03/011/04

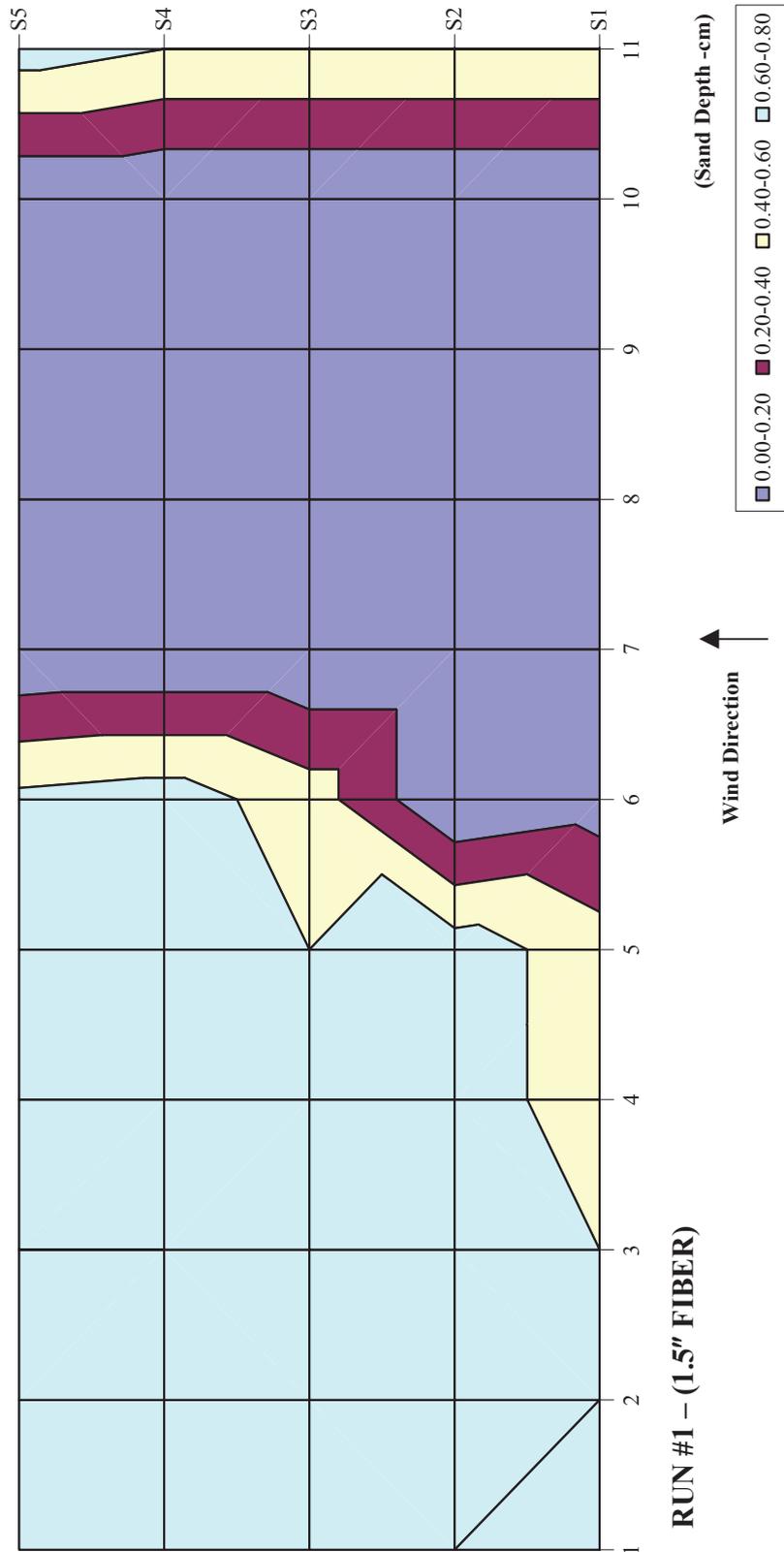


FIGURE C-52. TEST 8—RUN 1, FOUR CYCLES AT 40 FEET



FIGURE C-53. TEST 8—1.5-INCH FIBER TEST PLOT AFTER TESTS



FIGURE C-54. TEST 8—1.5-INCH FIBER TEST PLOT AFTER TESTS, CLOSE-UP