

ZONE 7 WATER AGENCY

**FILTER SURVEILLANCE
REPORT
FOR**

PATTERSON PASS WTP

PERFORMED & PREPARED

By:

ERS INDUSTRIAL SERVICES, INC.

Zone 7 Water Agency
100 North Canyons Parkway
Livermore, CA 94551

ATTENTION: ALLEN DAHLQUIST

REFERENCE: FIELD SURVEILLANCE REPORT – PATTERSON PASS WTP

Mr. Dahlquist:

On March 20 - 22, 2018 a crew from ERS Industrial Services, Inc. visited the Patterson Pass Water Treatment Plant located at 8750 Patterson Pass Rd. Livermore, CA 94550. The plant is owned and operated by the Zone 7 Water Agency. The purpose of this visit was to perform filter surveillance on three (3) 338 sq. foot, double cell, tri media, gravity filters, operated at the plant.

This filter surveillance consists of a number of tests, measurements and observations which, when conducted in accordance with AWWA standards, can provide insight into conditions that exist within the filters. When performed periodically, these tests can provide additional information on long term changes in filter conditions as they develop.

The following report includes the field notes that document the observations, measurements and test results as well as copies of the results of the laboratory tests performed on the samples taken from each filter.

GENERAL NOTES:

The three (3) double cell filters were observed to be uniform in their appearance and over all operational characteristics. The following items were either outside of the specifications provided, or were of particular note.

1. Media depths in all three (3) filters were measured to be below the thirty-three (33) inch specifications.
2. Gravel beds were uneven in all three (3) filters.
3. Sand tested higher than the .42 – .52 effective size specifications in all three (3) filters.
4. Anthracite tested higher than the 1.0 – 1.1 effective size specifications with the exception of filter 3A.
5. Coatings in Filter Two (2) are failing.

If you have any questions regarding this information, how it was obtained or how to interpret it, please feel free to contact me.

Sincerely,

A handwritten signature in black ink, appearing to read 'Bradford Radonich II', written in a cursive style.

Bradford Radonich II

FILTER 1A ANALYSIS

FILTER SURVEILLANCE

Filter Evaluation for: Zone 7 **Plant:** Patterson Pass WTP
Filter Type: Gravity **Contact:** Allan Dahlquist **Phone #** 925-786-5433
Filter Number: 1A **Inspector:** Isidro Martinez **Date:** 3/20/2018

Pre Backwash Inspection

Filter Surface: Media surface has a coating of mud but appears level.

Acceptable

Wall Condition: Coatings are smooth and solidly attached with minor cracks on the wall between filter 2. Also Ferric Chloride staining on walls.

Acceptable

Mechanical System: Surface wash is complete and working as designed. Troughs are level and in good condition.

Acceptable

Media Measurements

Freeboard Measurements: (Inches from lip to top of media)

	1	2	3	4	5	6
A	46	46	45	46	47	46
B	45	46	47	47	46	46
C	46	45	46	46	45	46

Media Depth: (Inches from top of media to gravel bed)

	1	2	3	4	5	6
A	28	28	28	22	26	19
B	24	24	28	24	25	29
C	31	26	21	26	28	29

Support Gravel: (Footprint in inches)

	1	2	3	4	5	6
A	74	74	73	68	73	65
B	69	70	75	71	71	75
C	77	71	67	72	73	75

Media Core Samples:**Yes**

	Specified (Inches)	Measured (Inches)
GAC/Anthracite:	<u>18</u>	<u>16</u>
Sand:	<u>12</u>	<u>11</u>
High Density Sand:	<u>3</u>	<u>1</u>
Total Depth:	<u>33</u>	<u>28</u>
Media Interface:	<u><2</u>	<u>2</u>

Backwash

General Observation: Backwash initiated smoothly. Backwash water was cloudy at end of cycle. Filter media was level and clean after cycle. Water samples every 30 seconds.

Acceptable

Media Expansion: 5 in 17.86%

Post Backwash**Media Core Samples ES-UC**

Effective Size

Uniformity Coefficient

	Specified	Actual	Specified	Actual
GAC/Anthracite:	<u>1.0-1.1</u>	<u>1.13</u>	<u><1.5</u>	<u>1.29</u>
Sand:	<u>.42-.52</u>	<u>0.57</u>	<u><1.5</u>	<u>1.26</u>
High Density Sand:	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>
Other:	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>
Sample Analysis Included	<u>Yes</u>			

ERS INDUSTRIAL SERVICES, INC.

Filter Media Analysis

Project: Zone 7 (3 Gravity Filters, Double Cell) Patterson Pass 2018

Sample No: ZN-1A-A#0001

Location: Livermore, CA

Material: Anthracite

Source: ERS Industrial Services, Inc.

Date Sampled: 3/20/2018

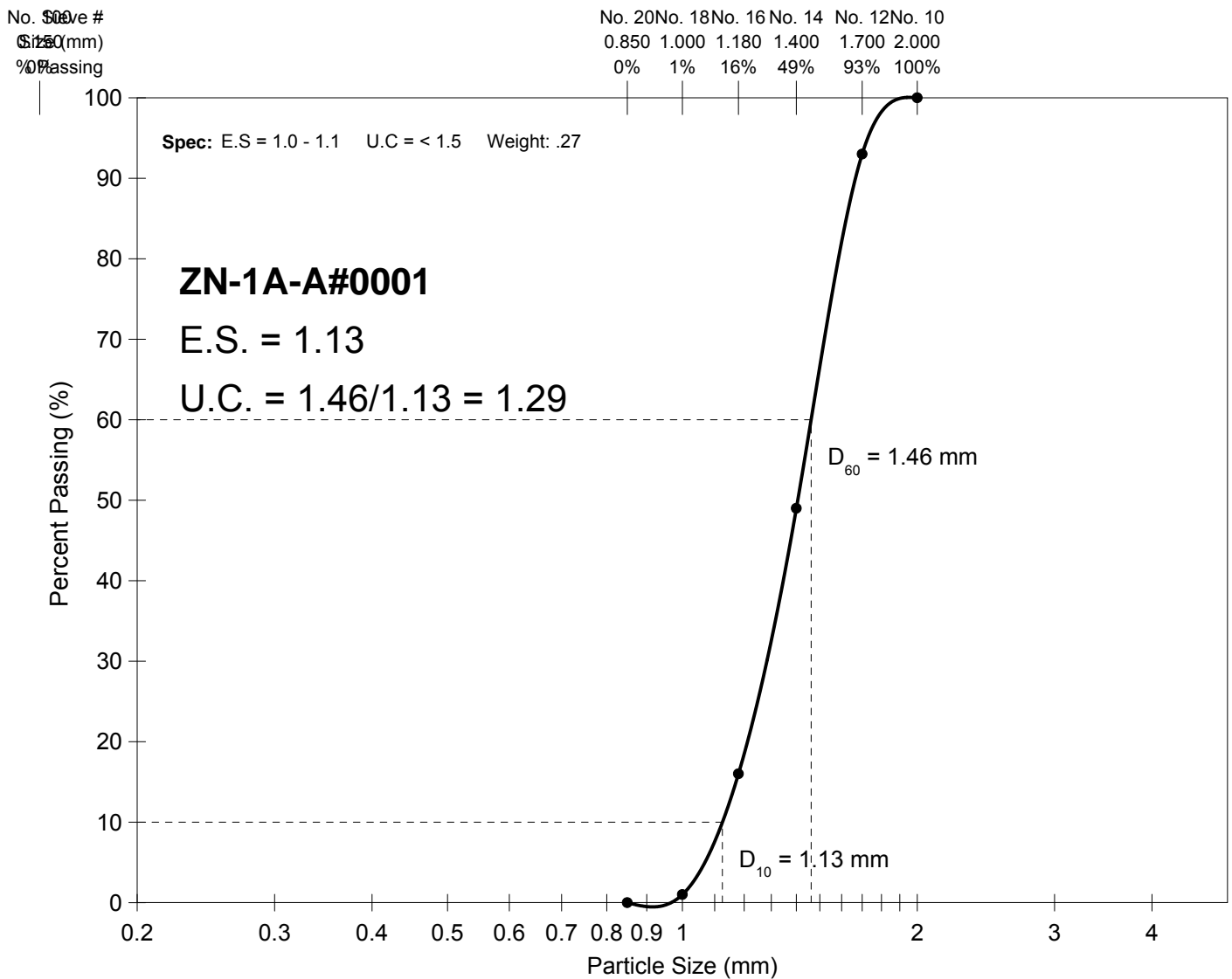
Sampled By: Ricky Lim

Date Tested: 4/3/2018

Tested By: Francisco G.

Sieve Set: A.S.T.M C134/CAL 202

Date Calibrated: 4/1/2018



Remarks: Sieve Analysis

ERS INDUSTRIAL SERVICES, INC.

Filter Media Analysis

Project: Zone 7 (3 Gravity Filters, Double Cell) Patterson Pass 2018

Sample No: ZN-1S-A#0001

Location: Livermore, CA

Material: Sand

Source: ERS Industrial Services, Inc

Date Sampled: 3/20/2018

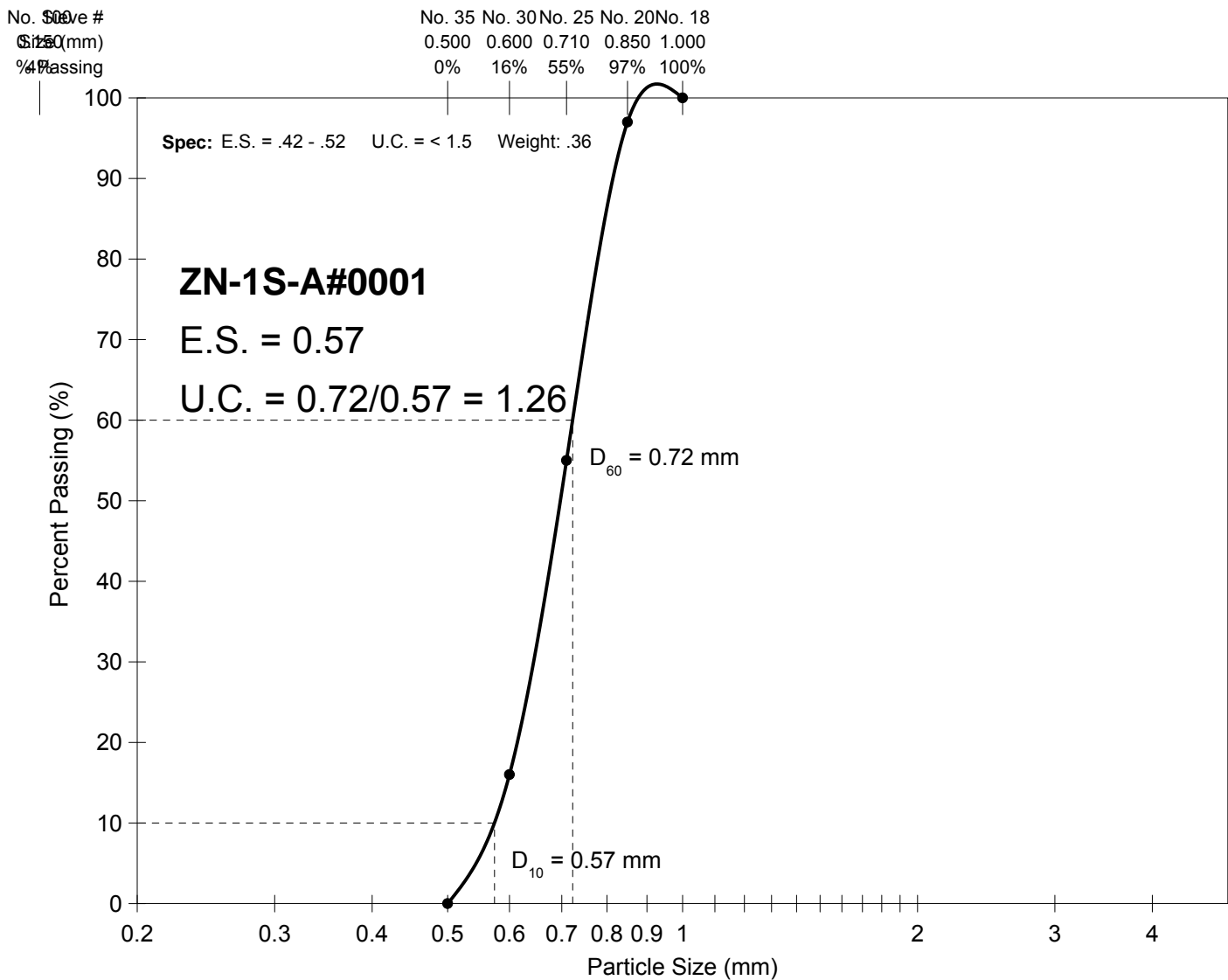
Sampled By: Ricky Lim

Date Tested: 4/3/2018

Tested By: Francisco G.

Sieve Set: A.S.T.M C134/CAL 202

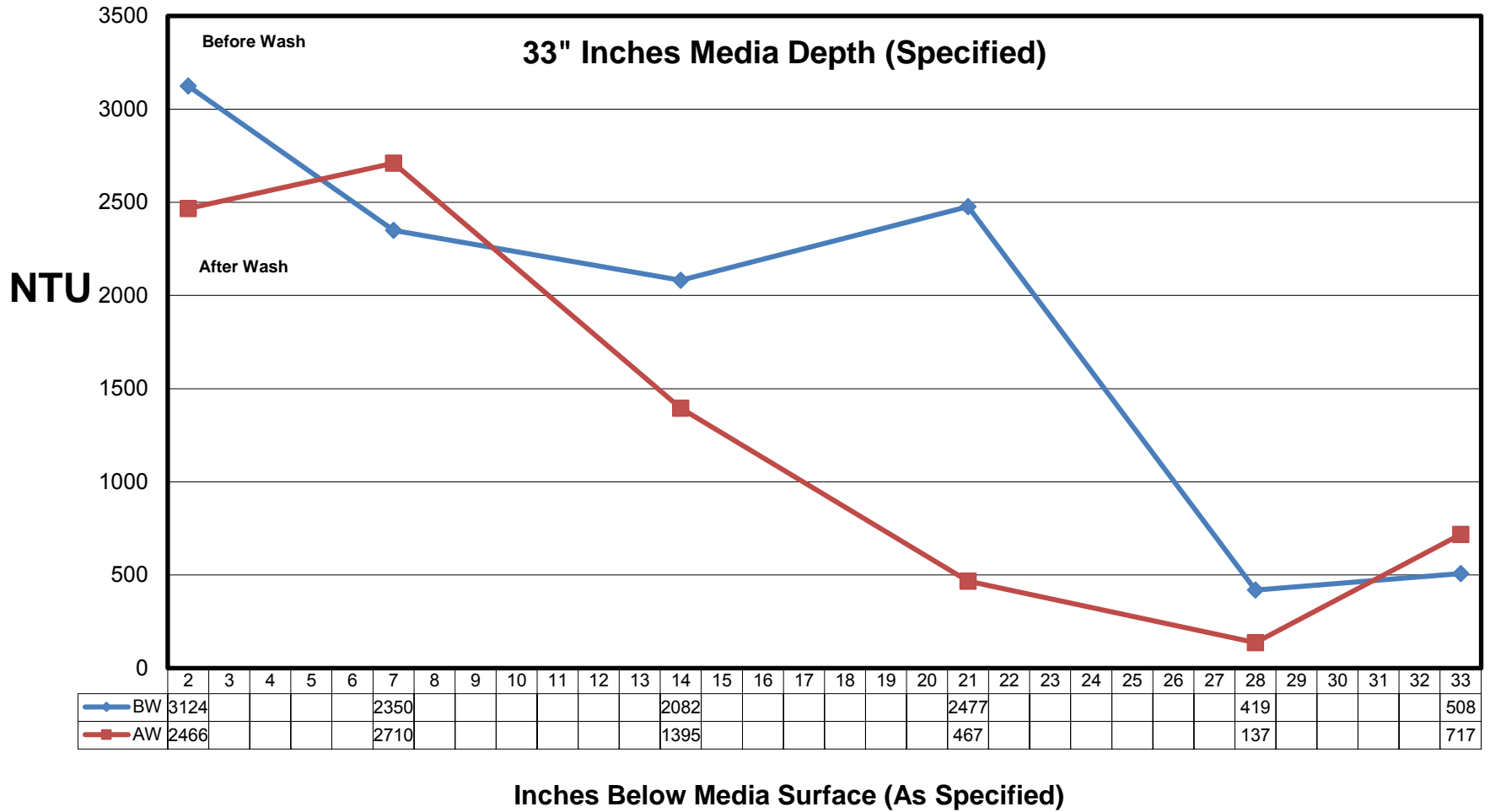
Date Calibrated: 4/1/2018



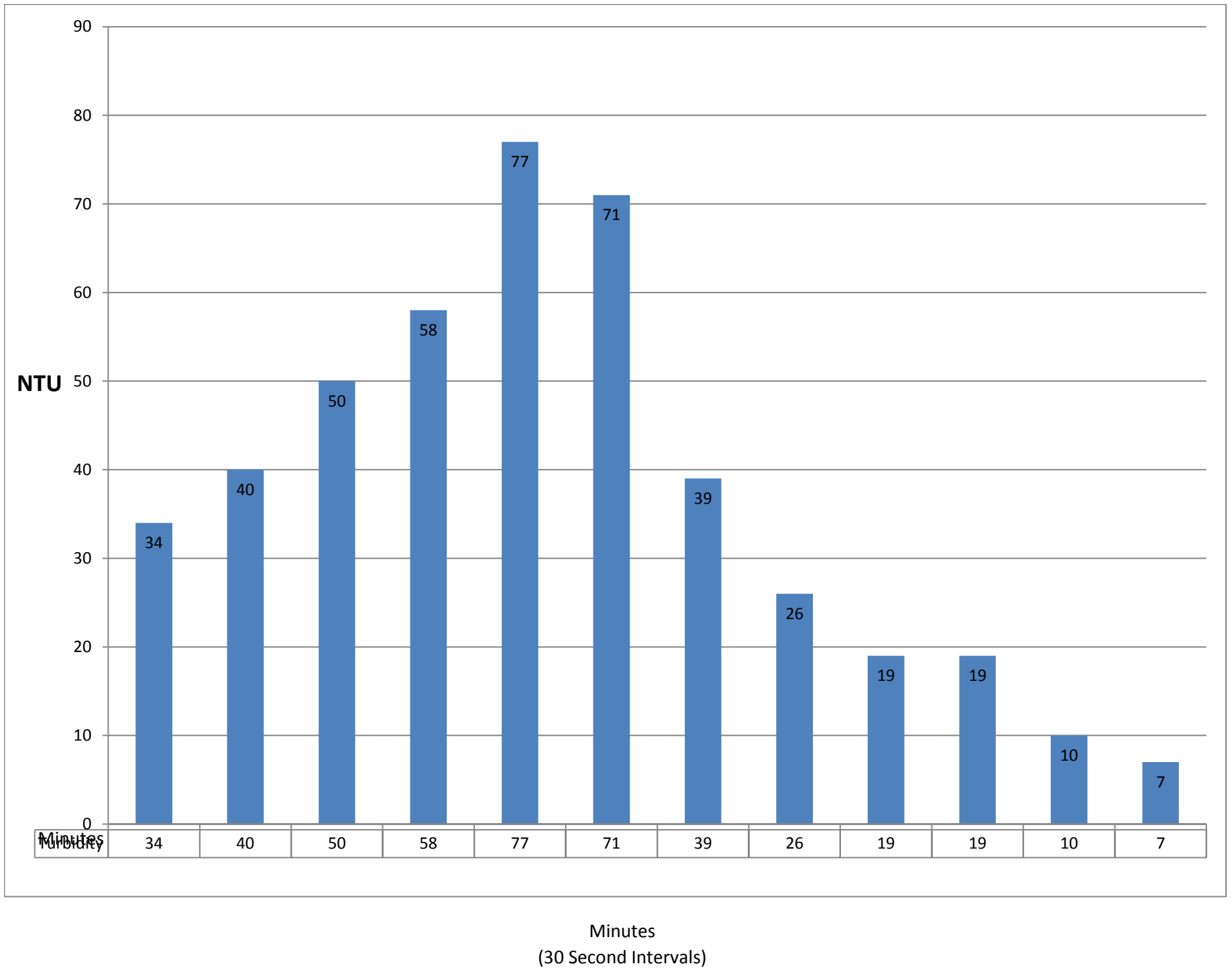
Remarks: Sieve Analysis

Patterson Pass WTP
Flock Retention Analysis

Filter: 1A



Patterson Pass WTP
1A






FILTER LAYOUT

Zone 7
Patterson Pass WTP
1A

	A		B		C	
	F	M	F	M	F	M
6	46	19	46	29	46	29
TROUGH 3						
5	47	26	46	25	45	28
4	46	22	47	24	46	26
3	45	28	47	28	46	21
2	46	28	46	24	45	26
1	46	28	45	24	46	31
	A		B		C	

N

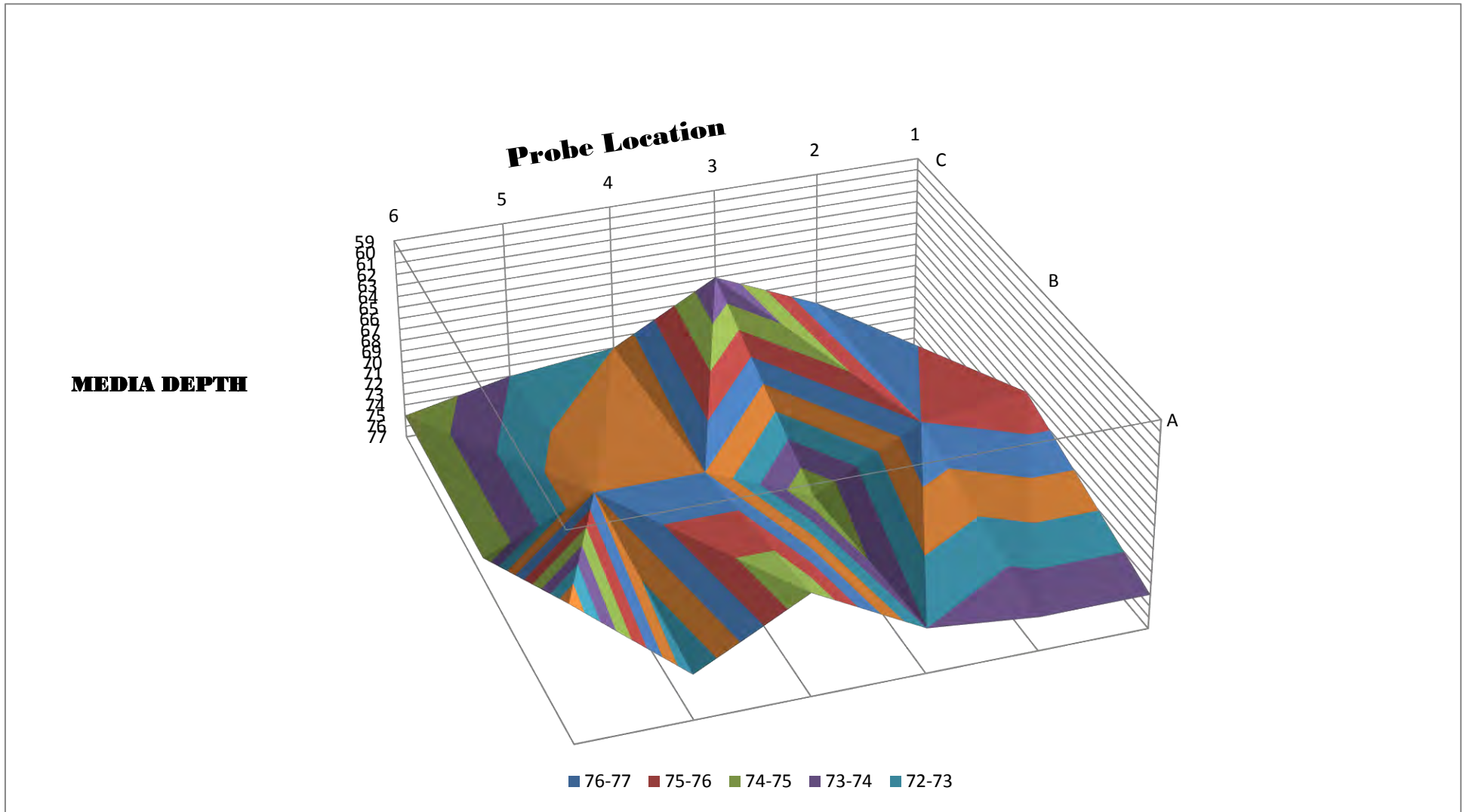
	Before Wash Core
	After Wash Core
	Expansion Tool Location



GRAVEL PROFILE

Zone 7
Patterson Pass WTP
1A

	1	2	3	4	5	6
A	74	74	73	68	73	65
B	69	70	75	71	71	75
C	77	71	67	72	73	75



FILTER 1B ANALYSIS

ERS INDUSTRIAL SERVICES, INC.

2120 Warm Springs Ct.

510-770-0202 phone

510-490-3024 fax

FILTER SURVEILLANCE

Filter Evaluation for: Zone 7 Plant: Patterson Pass WTP
Filter Type: Gravity Contact: Allan Dahlquist Phone # 925-786-5433
Filter Number: 1B Inspector: Isidro Martinez Date: 3/20/2018

Pre Backwash Inspection

Filter Surface: Media surface has a coating of mud but appears level.

Acceptable

Wall Condition: Coatings are smooth and solidly attached with minor cracks on the wall between filter 2. Also Ferric Chloride staining on walls.

Acceptable

Mechanical System: Surface wash is complete and working as designed. Troughs are level and in good condition. Freeboard to nozzle West side 12 inches and East side 9 inches.

Acceptable

Media Measurements

Freeboard Measurements: (Inches from lip to top of media)

	1	2	3	4	5	6
A	45	45	45	45	46	46
B	46	46	46	46	46	46
C	45	45	46	46	46	46

Media Depth: (Inches from top of media to gravel bed)

	1	2	3	4	5	6
A	26	26	24	24	29	26
B	20	28	22	24	24	29
C	28	27	24	25	25	26

Support Gravel: (Footprint in inches)

	1	2	3	4	5	6
A	71	71	69	69	75	72
B	66	74	68	70	70	75
C	73	72	70	71	71	72

Media Core Samples:**Yes**

	Specified (Inches)	Measured (Inches)
GAC/Anthracite:	<u>18</u>	<u>12</u>
Sand:	<u>12</u>	<u>12</u>
High Density Sand:	<u>3</u>	<u>1</u>
Total Depth:	<u>33</u>	<u>25</u>
Media Interface:	<u><2</u>	<u>2</u>

Backwash

General Observation: Backwash initiated smoothly. Backwash water was cloudy at end of cycle. Filter media was level and clean after cycle. Water samples every 30 seconds.

Acceptable

Media Expansion: 5 in 20.00%

Post Backwash**Media Core Samples ES-UC**

Effective Size

Uniformity Coefficient

	Effective Size		Uniformity Coefficient	
	Specified	Actual	Specified	Actual
GAC/Anthracite:	<u>1.0-1.1</u>	<u>1.21</u>	<u><1.5</u>	<u>1.31</u>
Sand:	<u>.42-.52</u>	<u>0.59</u>	<u><1.5</u>	<u>1.24</u>
High Density Sand:	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>
Other:	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>
Sample Analysis Included	<u>Yes</u>			

ERS INDUSTRIAL SERVICES, INC.

Filter Media Analysis

Project: Zone 7 (3 Gravity Filters, Double Cell) Patterson Pass 2018

Sample No: ZN-1A-B#0001

Location: Livermore, CA

Material: Anthracite

Source: ERS Industrial Services, Inc

Date Sampled: 3/20/2018

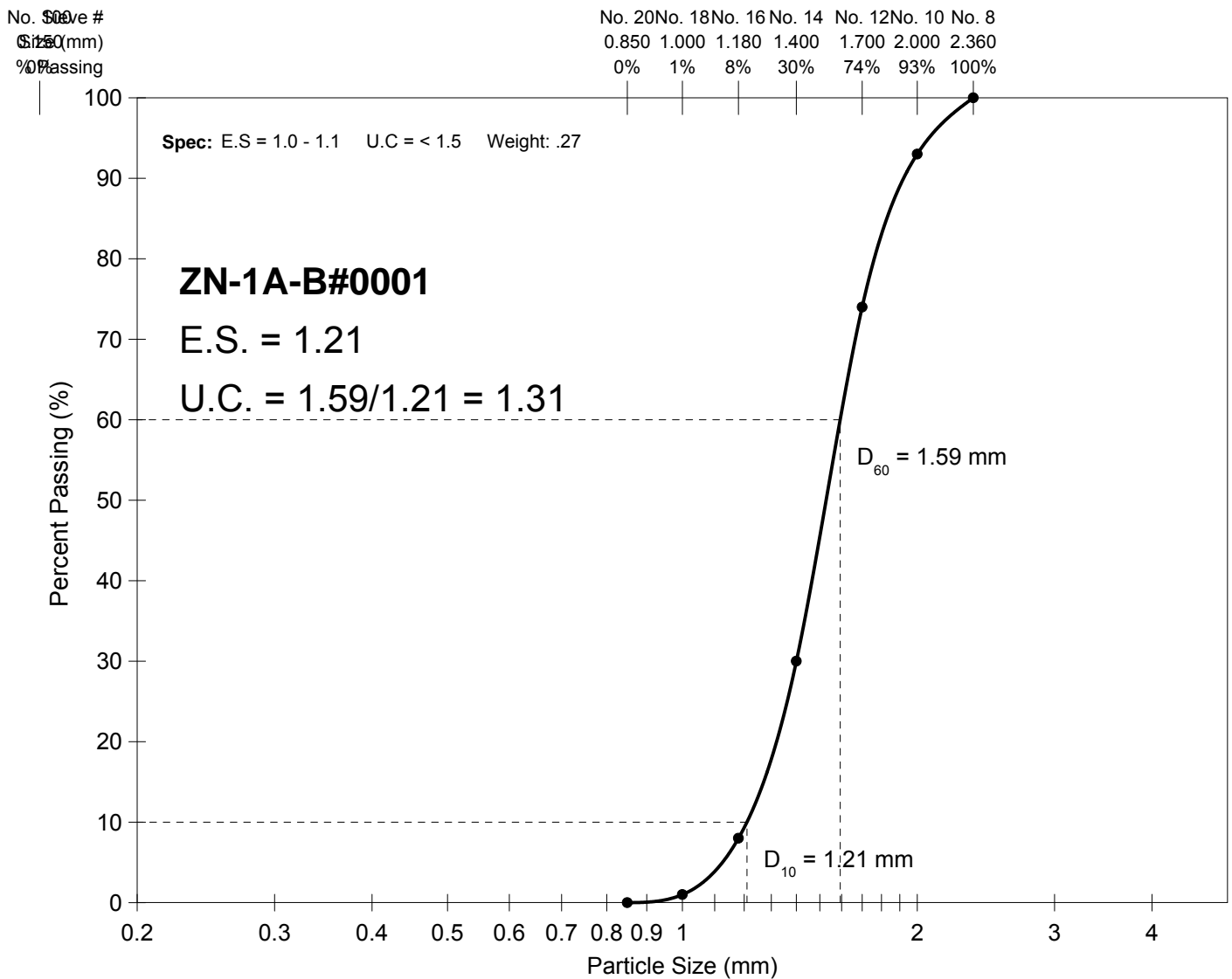
Sampled By: Ricky Lim

Date Tested: 4/3/2018

Tested By: Francisco G.

Sieve Set: A.S.T.M C134/CAL 202

Date Calibrated: 4/1/2018



Remarks: Sieve Analysis

ERS INDUSTRIAL SERVICES, INC.

Filter Media Analysis

Project: Zone 7 (3 Gravity Filters, Double Cell) Patterson Pass 2018

Sample No: ZN-1S-B#0001

Location: Livermore, CA

Material: Sand

Source: ERS Industrial Services, Inc

Date Sampled: 3/20/2018

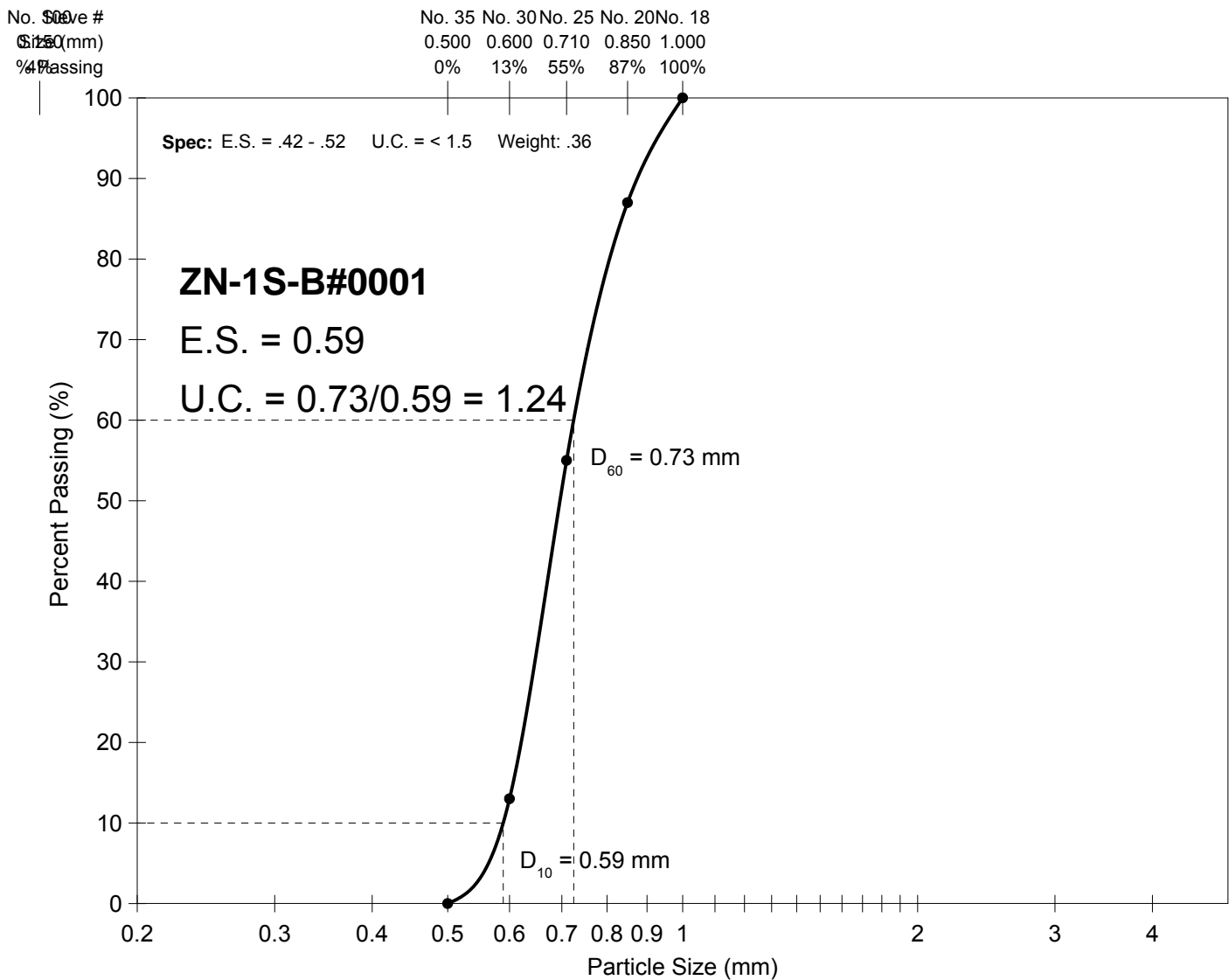
Sampled By: Ricky Lim

Date Tested: 4/3/2018

Tested By: Francisco G.

Sieve Set: A.S.T.M C134/CAL 202

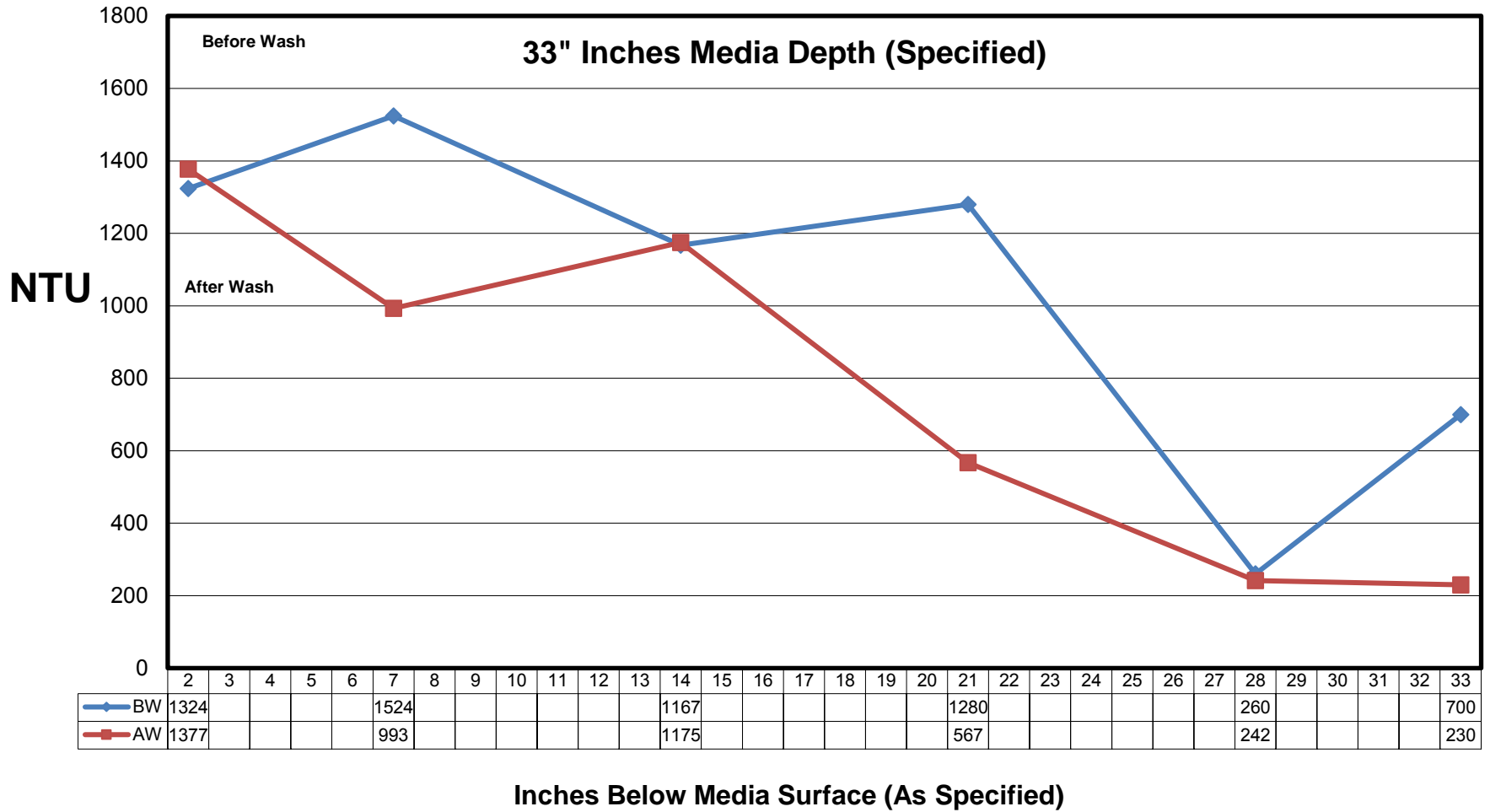
Date Calibrated: 4/1/2018



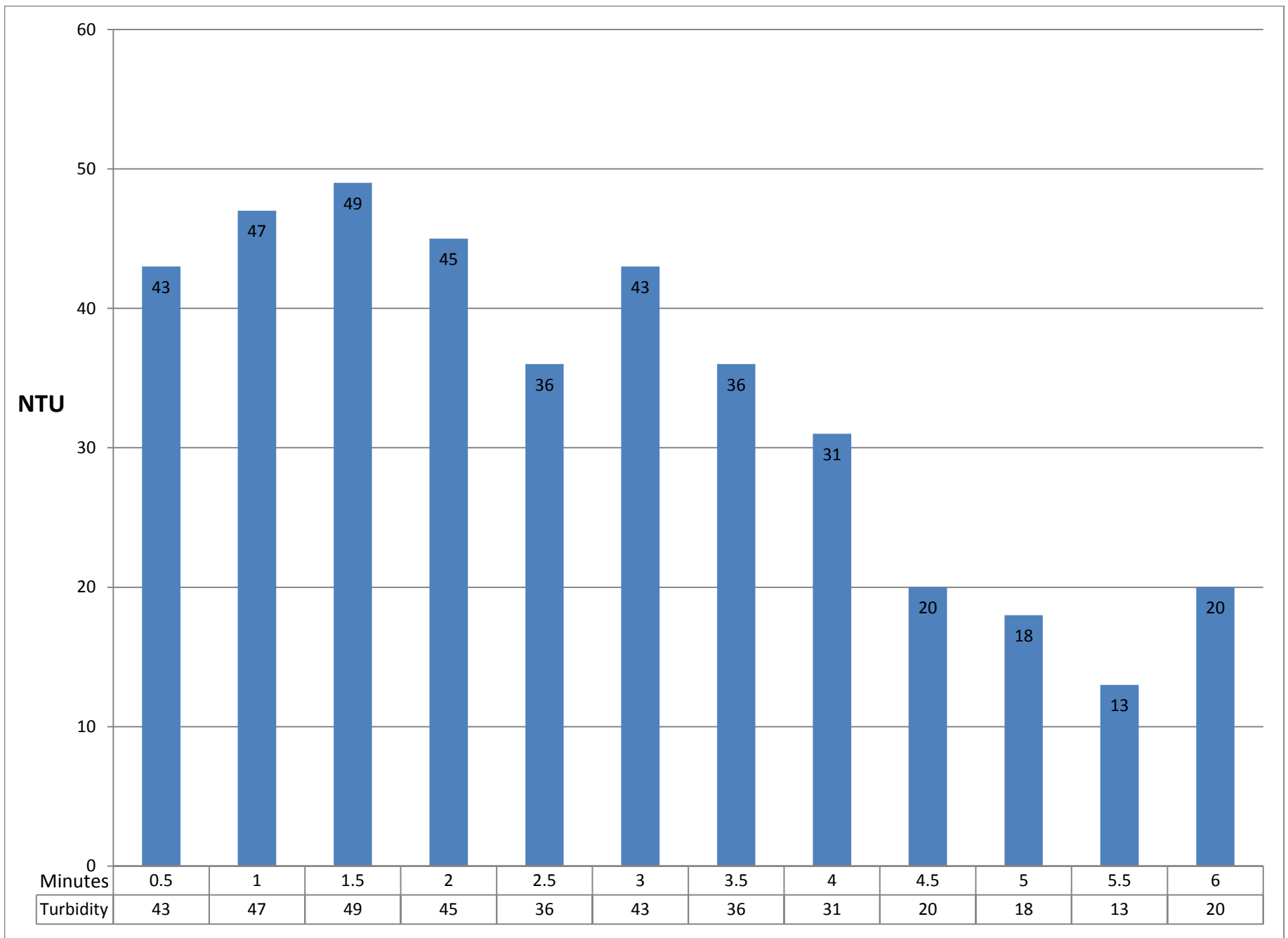
Remarks: Sieve Analysis

Patterson Pass WTP
Flock Retention Analysis

Filter: 1B



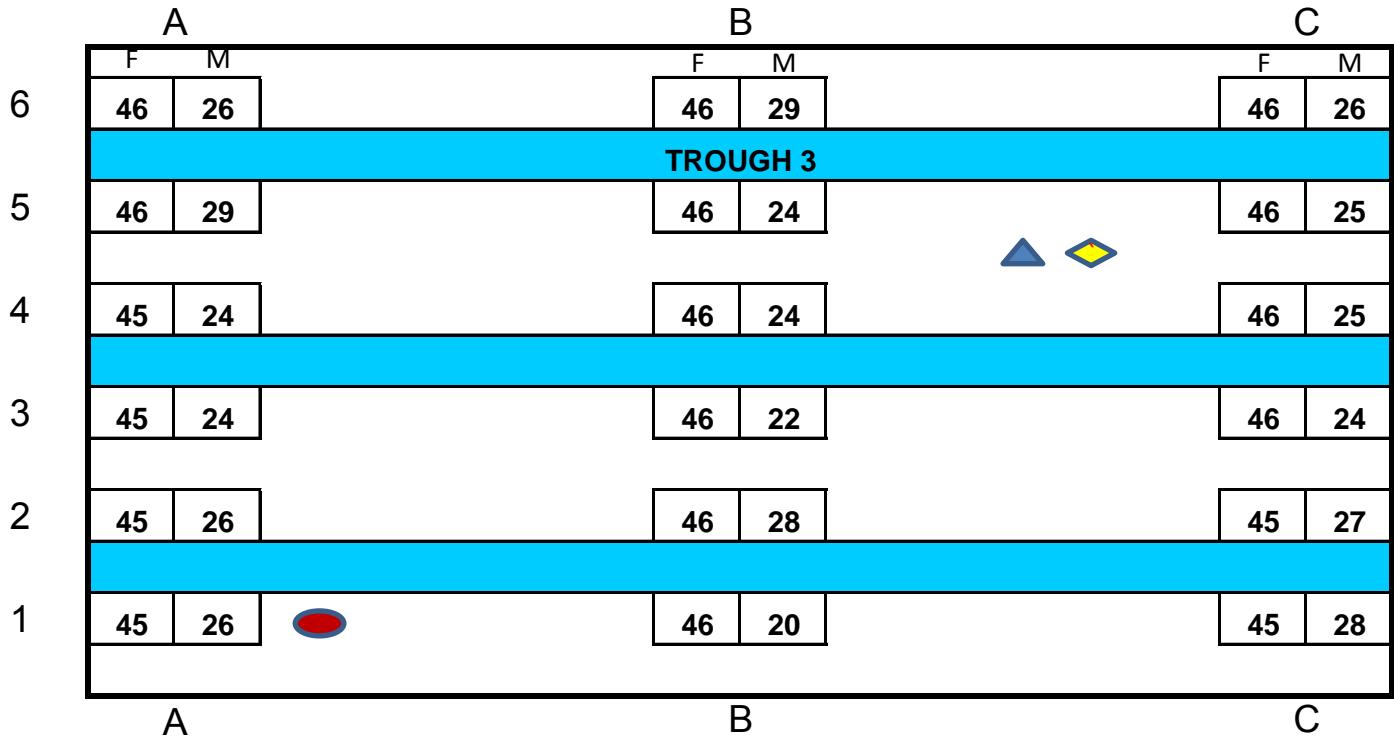
Patterson Pass WTP
1B






Minutes
(30 Second Intervals)

FILTER LAYOUT

Zone 7
Patterson Pass WTP
1B



N

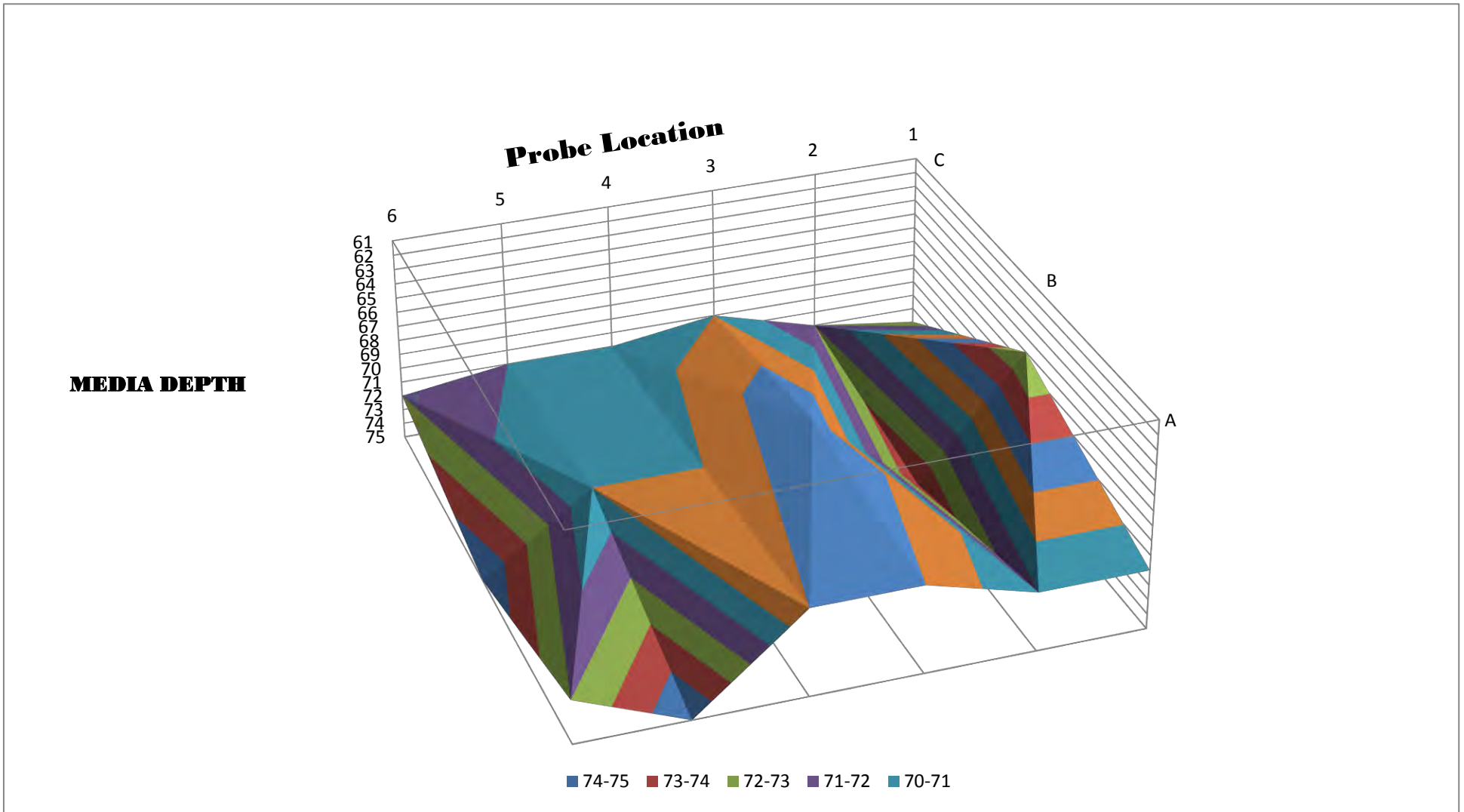
	Before Wash Core
	After Wash Core
	Expansion Tool Location



GRAVEL PROFILE

Zone 7
Patterson Pass WTP
1B

	1	2	3	4	5	6
A	71	71	69	69	75	72
B	66	74	68	70	70	75
C	73	72	70	71	71	72



FILTER 2A ANALYSIS

ERS INDUSTRIAL SERVICES, INC.

2120 Warm Springs Ct.

510-770-0202 phone

510-490-3024 fax

FILTER SURVEILLANCE

Filter Evaluation for: Zone 7 Plant: Patterson Pass WTP
 Filter Type: Gravity Contact: Allan Dahlquist Phone #: 925-786-5433
 Filter Number: 2A Inspector: Isidro Martinez Date: 3/20/2018

Pre Backwash Inspection

Filter Surface: Media surface has a coating of mud but appears level.

Acceptable

Wall Condition: Coatings are failing with corrosion. Couple cracks on North and South walls.

Acceptable

Mechanical System: Surface wash is complete and working as designed. Troughs are level and in good condition. Freeboard to nozzle on the North and South side were measured at 8 inches.

Acceptable

Media Measurements

Freeboard Measurements: (Inches from lip to top of media)

	1	2	3	4	5	6
A	44	44	44	44	44	44
B	44	44	44	44	45	45
C	44	44	44	44	44	44

Media Depth: (Inches from top of media to gravel bed)

	1	2	3	4	5	6
A	30	30	28	27	27	27
B	26	28	28	23	25	27
C	27	24	28	28	23	27

Support Gravel: (Footprint in inches)

	1	2	3	4	5	6
A	74	74	72	71	71	71
B	70	72	72	67	70	72
C	71	68	72	72	67	71

Media Core Samples:**Yes**

	Specified (Inches)	Measured (Inches)
GAC/Anthracite:	<u>18</u>	<u>12</u>
Sand:	<u>12</u>	<u>13</u>
High Density Sand:	<u>3</u>	<u>1</u>
Total Depth:	<u>33</u>	<u>26</u>
Media Interface:	<u><2</u>	<u>2</u>

Backwash

General Observation: Backwash initiated smoothly. Backwash water was clear at end of cycle. Filter media was level and clean after cycle. Water samples every 30 seconds.

Acceptable

Media Expansion: 7 in 26.92%

Post Backwash**Media Core Samples ES-UC**

Effective Size

Uniformity Coefficient

	Effective Size		Uniformity Coefficient	
	Specified	Actual	Specified	Actual
GAC/Anthracite:	<u>1.0-1.1</u>	<u>1.13</u>	<u><1.5</u>	<u>1.35</u>
Sand:	<u>.42-.52</u>	<u>0.61</u>	<u><1.5</u>	<u>1.23</u>
High Density Sand:	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>
Other:	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>
Sample Analysis Included	<u>Yes</u>			

ERS INDUSTRIAL SERVICES, INC.

Filter Media Analysis

Project: Zone 7 (3 Gravity Filters, Double Cell) Patterson Pass 2018

Sample No: ZN-2A-A#0001

Location: Livermore, CA

Material: Anthracite

Source: ERS Industrial Services, Inc

Date Sampled: 3/20/2018

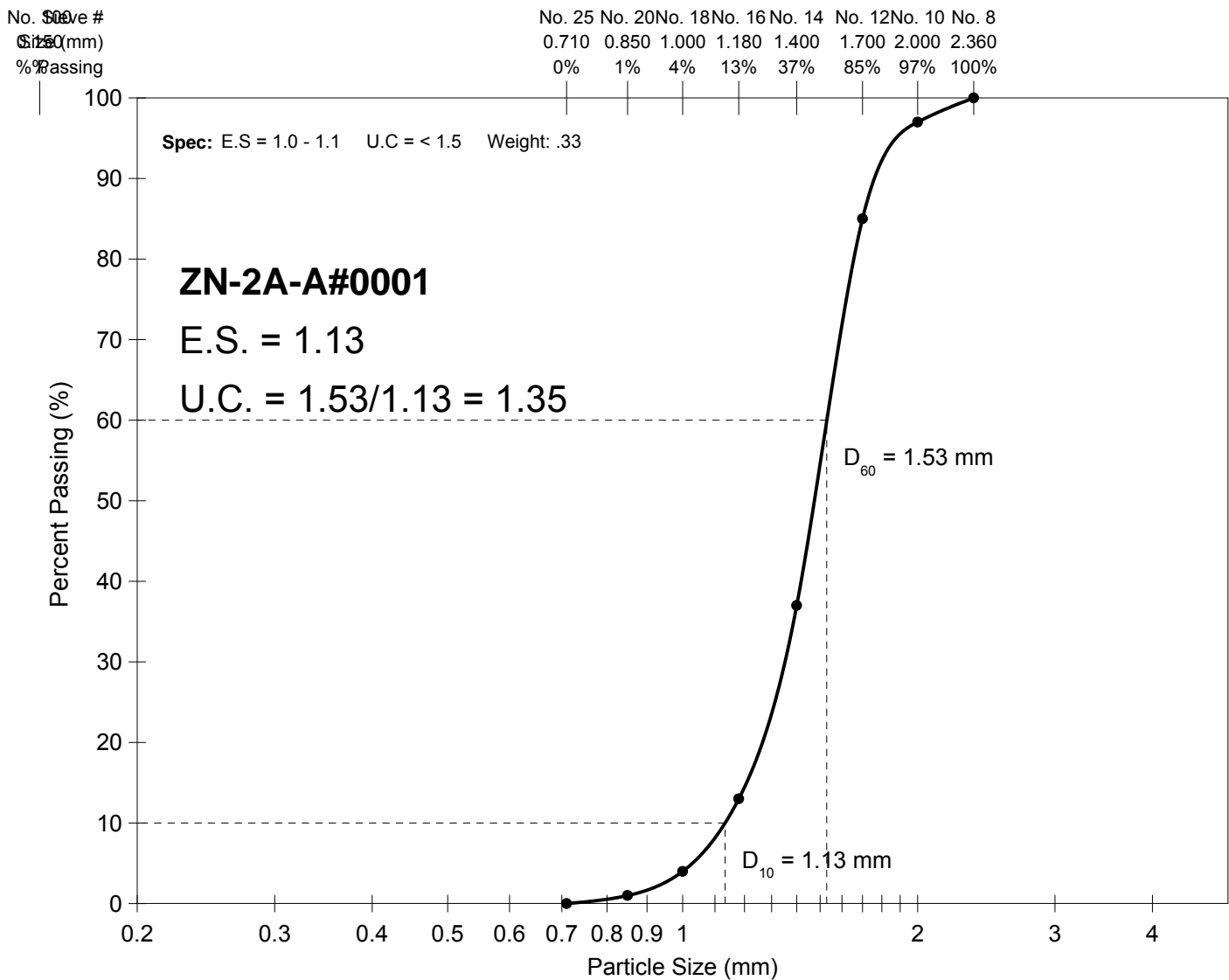
Sampled By: Ricky Lim

Date Tested: 4/3/2018

Tested By: Francisco G.

Sieve Set: A.S.T.M C134/CAL 202

Date Calibrated: 4/1/2018



Remarks: Sieve Analysis

ERS INDUSTRIAL SERVICES, INC.

Filter Media Analysis

Project: Zone 7 (3 Gravity Filters, Double Cell) Patterson Pass 2018

Sample No: ZN-2S-A#0001

Location: Livermore, CA

Material: Sand

Source: ERS Industrial Services, Inc

Date Sampled: 3/20/2018

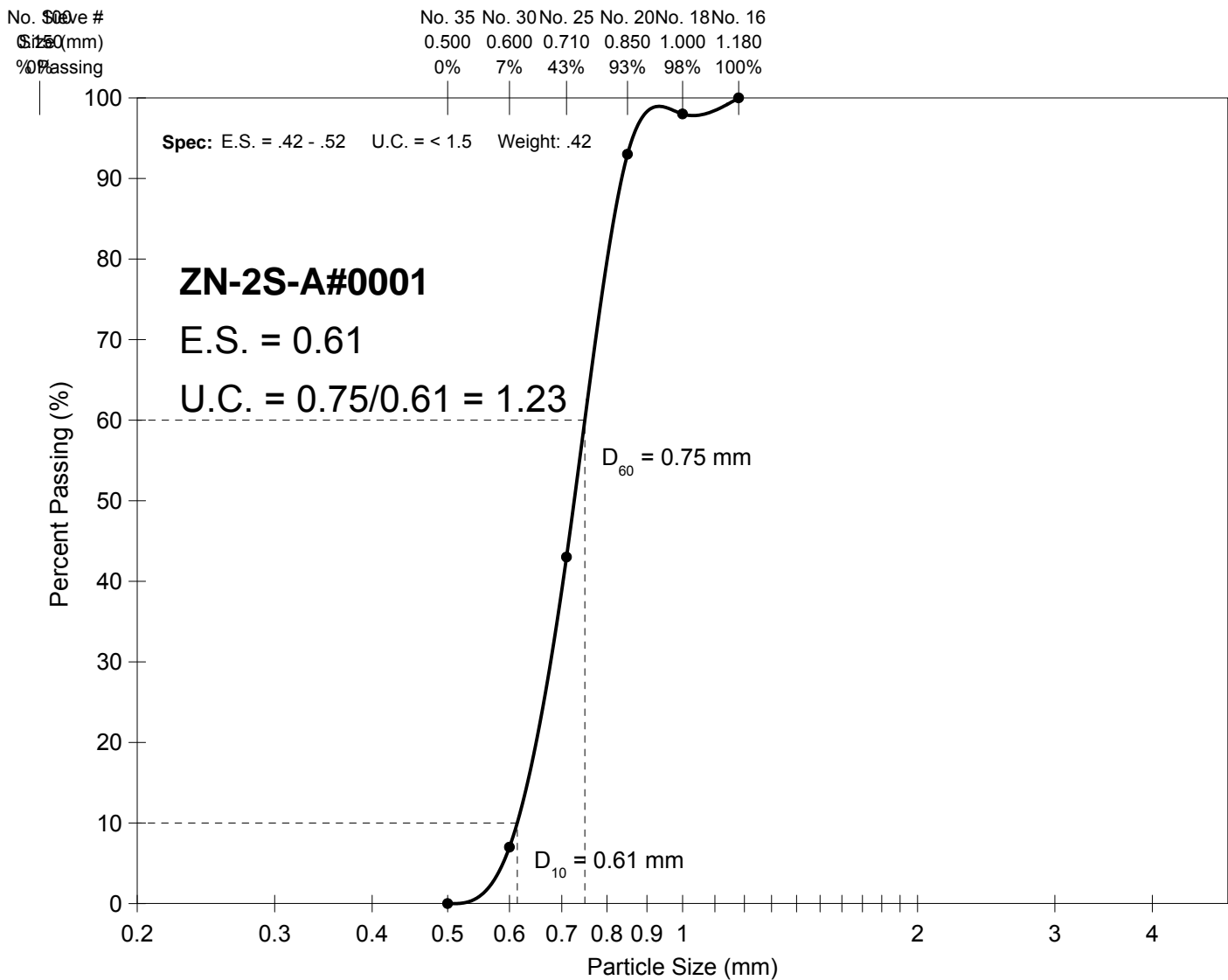
Sampled By: Ricky Lim

Date Tested: 4/3/2018

Tested By: Francisco G.

Sieve Set: A.S.T.M C134/CAL 202

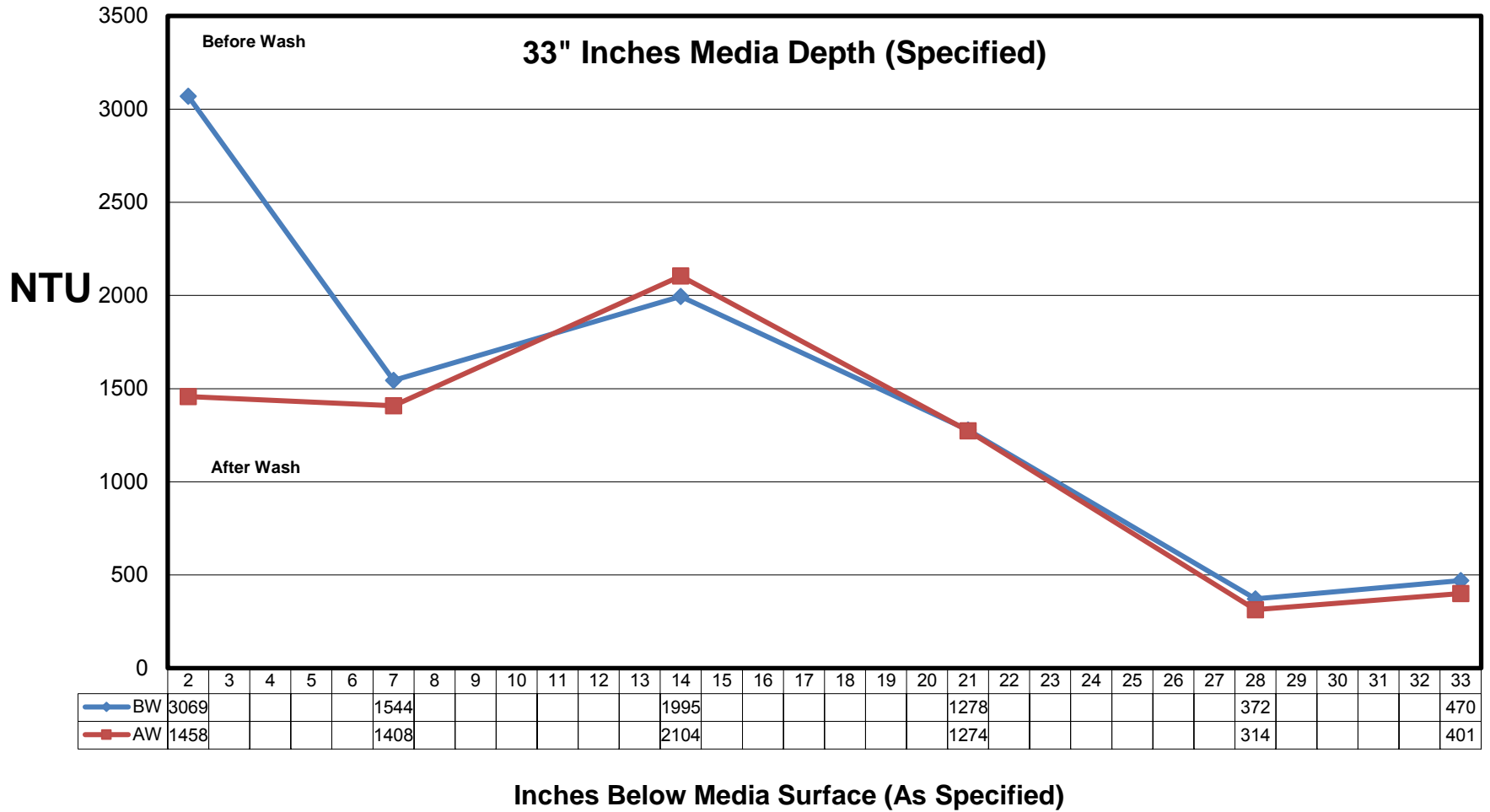
Date Calibrated: 4/1/2018



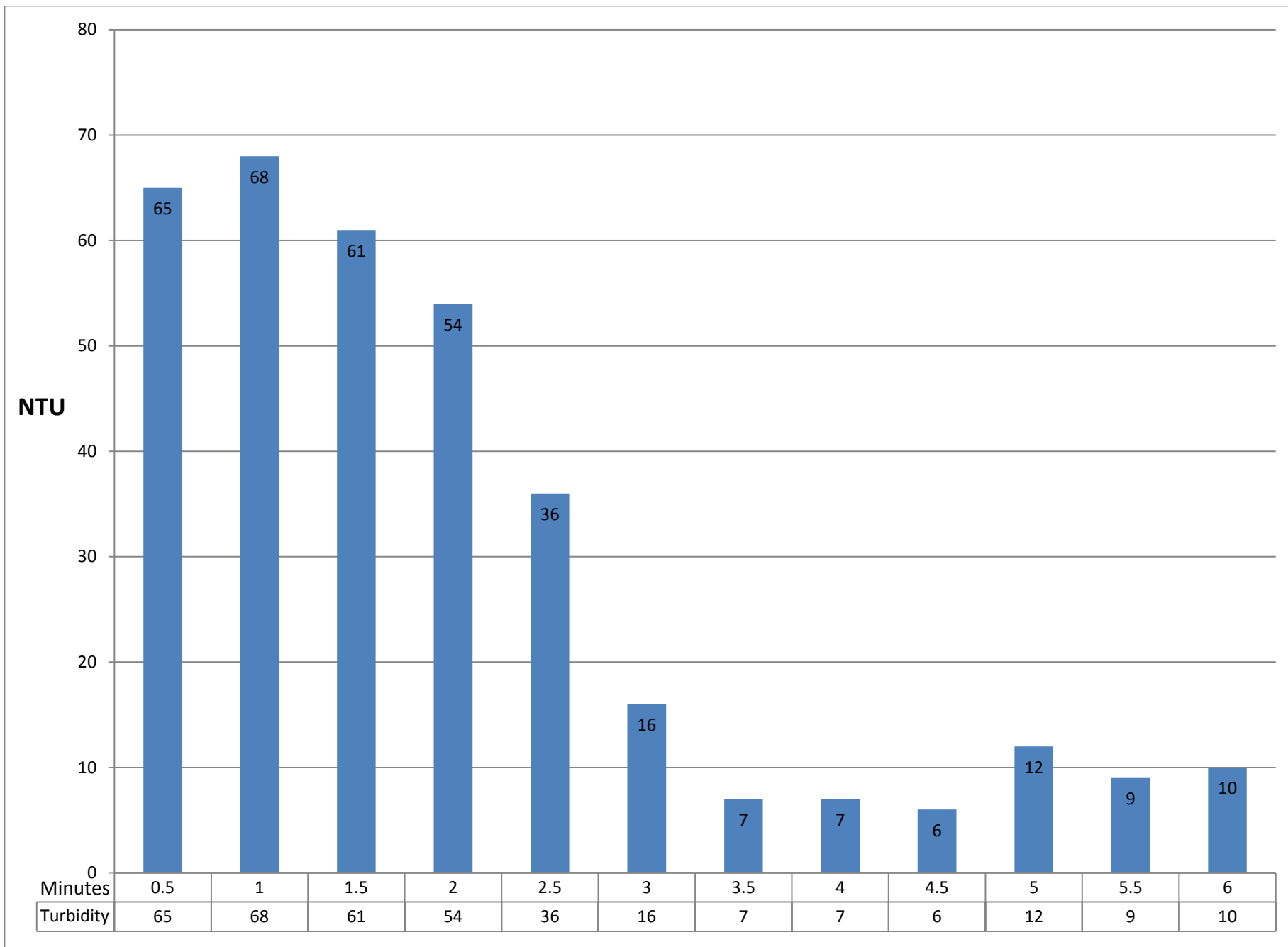
Remarks: Sieve Analysis

Patterson Pass WTP
Flock Retention Analysis

Filter: 2A



Patterson Pass WTP
2A






Minutes
(30 Second Intervals)

FILTER LAYOUT

Zone 7
Patterson Pass WTP
2A

	A		B		C	
	F	M	F	M	F	M
6	44	27	45	27	44	27
TROUGH 3						
5	44	27	45	25	44	23
4	44	27	44	23	44	28
3	44	28	44	28	44	28
2	44	30	44	28	44	24
1	44	30	44	26	44	27
	A		B		C	

N

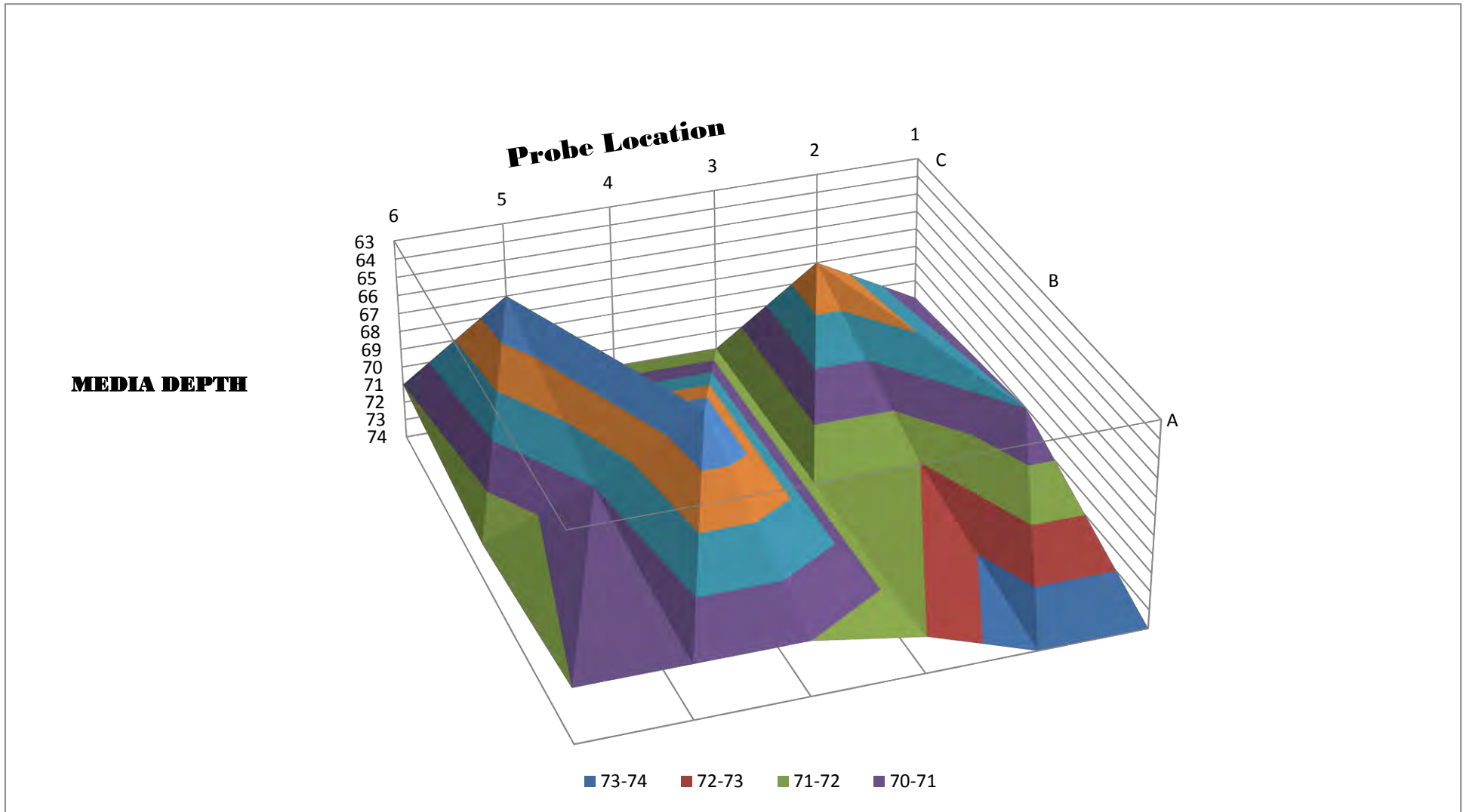
	Before Wash Core
	After Wash Core
	Expansion Tool Location



GRAVEL PROFILE

Zone 7
Patterson Pass WTP
2A

	1	2	3	4	5	6
A	74	74	72	71	71	71
B	70	72	72	67	70	72
C	71	68	72	72	67	71



FILTER 2B ANALYSIS

ERS INDUSTRIAL SERVICES, INC.

2120 Warm Springs Ct.

510-770-0202 phone

510-490-3024 fax

FILTER SURVEILLANCE

Filter Evaluation for: Zone 7 **Plant:** Patterson Pass WTP
Filter Type: Gravity **Contact:** Allan Dahlquist **Phone #** 925-786-5433
Filter Number: 2B **Inspector:** Isidro Martinez **Date:** 3/20/2018

Pre Backwash Inspection

Filter Surface: Media surface has a coating of mud but appears level.

Acceptable

Wall Condition: Coatings are failing with corrosion. Cracks noted on North and South walls.

Acceptable

Mechanical System: Surface wash is complete and working as designed. Troughs are level and in good condition. Freeboard to nozzle North side 15 inches and South side 11 inches.

Acceptable

Media Measurements

Freeboard Measurements: (Inches from lip to top of media)

	1	2	3	4	5	6
A	46	46	46	46	46	46
B	46	47	46	46	46	46
C	47	46	46	46	46	46

Media Depth: (Inches from top of media to gravel bed)

	1	2	3	4	5	6
A	21	23	19	22	24	23
B	21	23	25	28	26	22
C	26	24	29	29	25	26

Support Gravel: (Footprint in inches)

	1	2	3	4	5	6
A	67	69	65	68	70	69
B	67	70	71	74	72	68
C	73	70	75	75	71	72

Media Core Samples:**Yes**

	Specified (Inches)	Measured (Inches)
GAC/Anthracite:	<u>18</u>	<u>12</u>
Sand:	<u>12</u>	<u>12</u>
High Density Sand:	<u>3</u>	<u>0</u>
Total Depth:	<u>33</u>	<u>24</u>
Media Interface:	<u><2</u>	<u>2</u>

Backwash

General Observation: Backwash initiated smoothly. Backwash water was clear at end of cycle. Filter media was level and clean after cycle. Water samples every 30 seconds.

Acceptable

Media Expansion: 7 in 29.17%

Post Backwash**Media Core Samples ES-UC**

Effective Size

Uniformity Coefficient

	Specified	Actual	Specified	Actual
GAC/Anthracite:	<u>1.0-1.1</u>	<u>1.13</u>	<u><1.5</u>	<u>1.33</u>
Sand:	<u>.42-.52</u>	<u>0.6</u>	<u><1.5</u>	<u>1.23</u>
High Density Sand:	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>
Other:	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>
Sample Analysis Included	<u>Yes</u>			

ERS INDUSTRIAL SERVICES, INC.

Filter Media Analysis

Project: Zone 7 (3 Gravity Filters, Double Cell) Patterson Pass 2018

Sample No: ZN-2A-B#0001

Location: Livermore, CA

Material: Anthracite

Source: ERS Industrial Services, Inc

Date Sampled: 3/20/2018

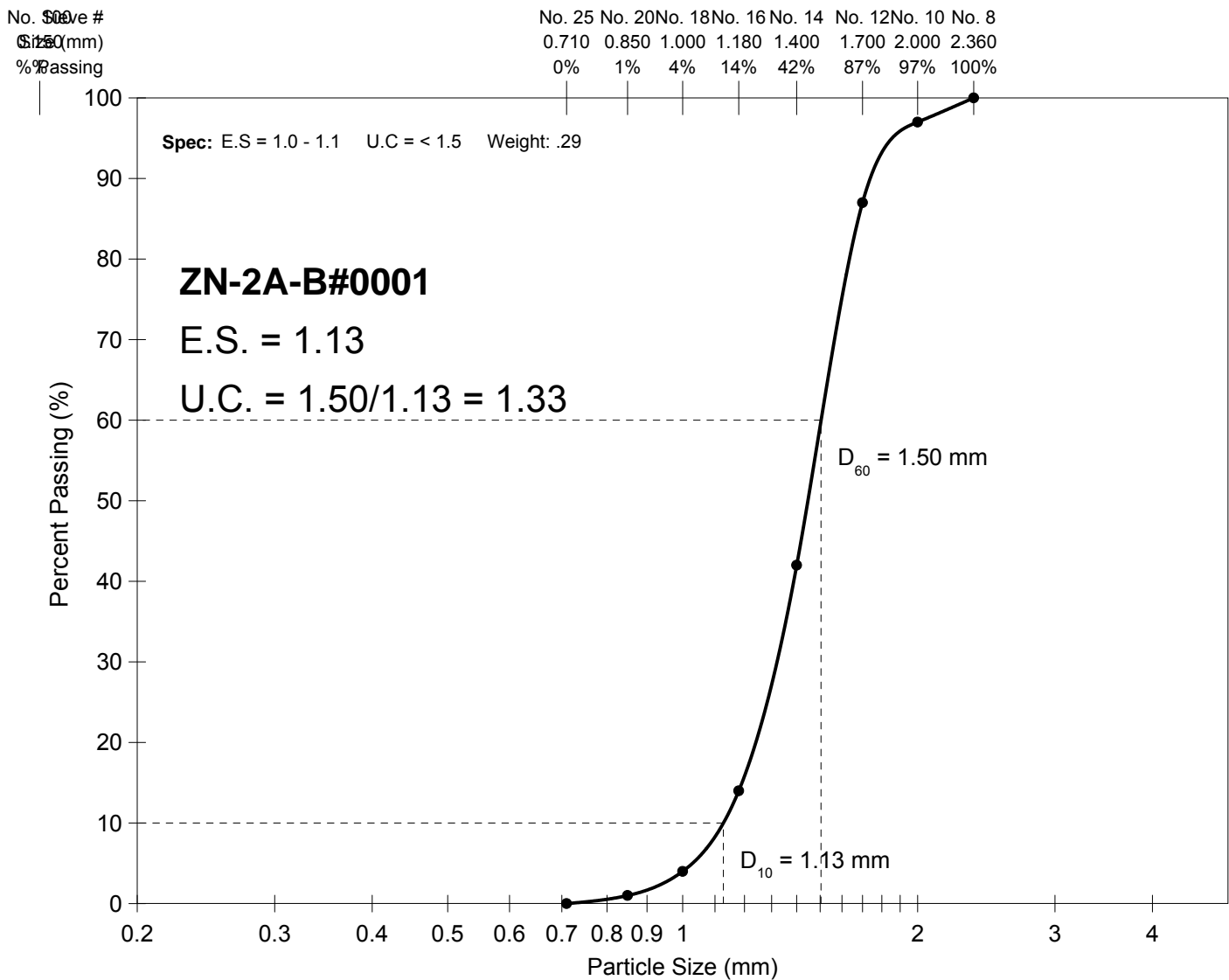
Sampled By: Ricky Lim

Date Tested: 4/3/2018

Tested By: Francisco G.

Sieve Set: A.S.T.M C134/CAL 202

Date Calibrated: 4/1/2018



Remarks: Sieve Analysis

ERS INDUSTRIAL SERVICES, INC.

Filter Media Analysis

Project: Zone 7 (3 Gravity Filters, Double Cell) Patterson Pass 2018

Sample No: ZN-2S-B#0001

Location: Livermore, CA

Material: Sand

Source: ERS Industrial Services, Inc

Date Sampled: 3/20/2018

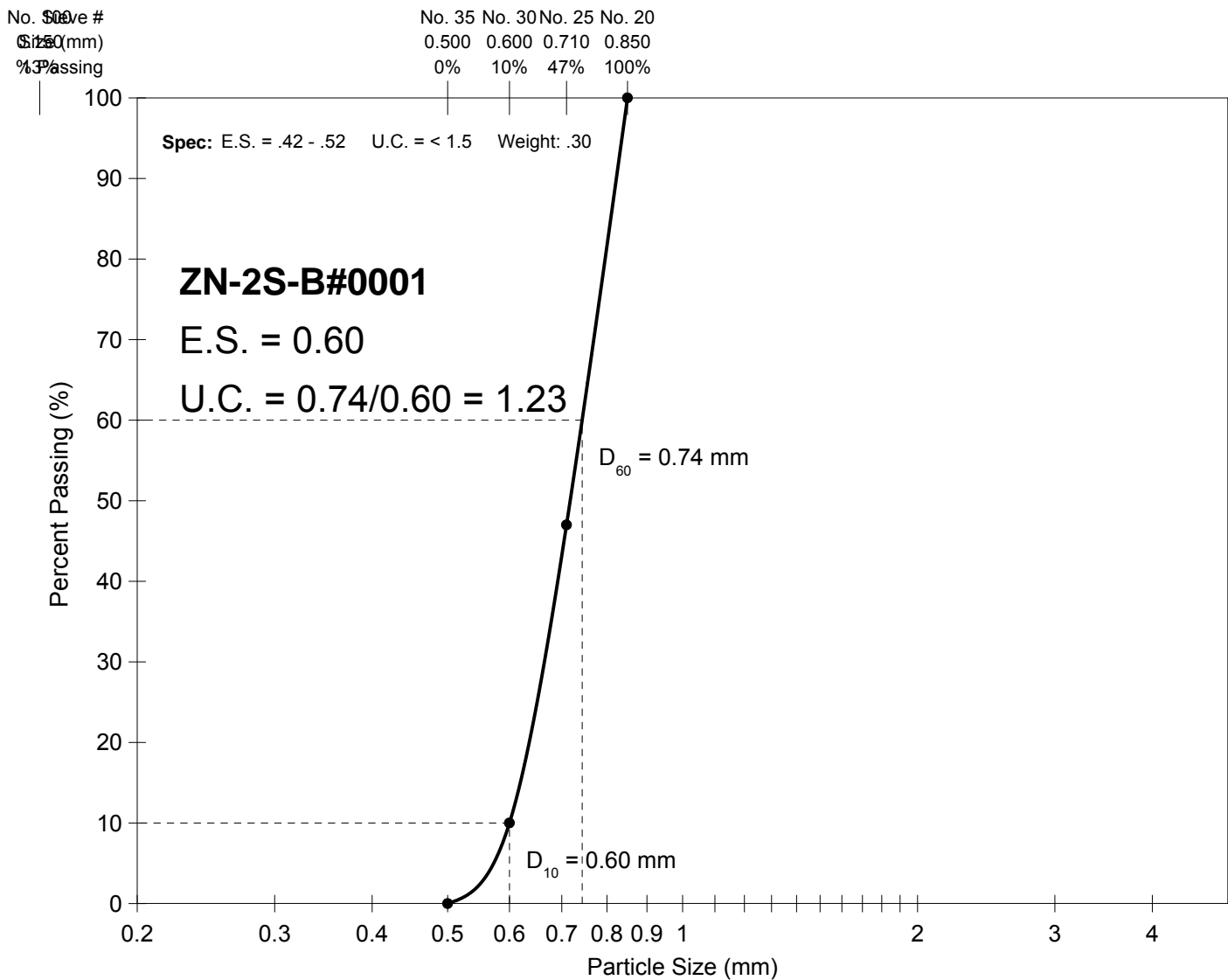
Sampled By: Ricky Lim

Date Tested: 4/3/2018

Tested By: Francisco G.

Sieve Set: A.S.T.M C134/CAL 202

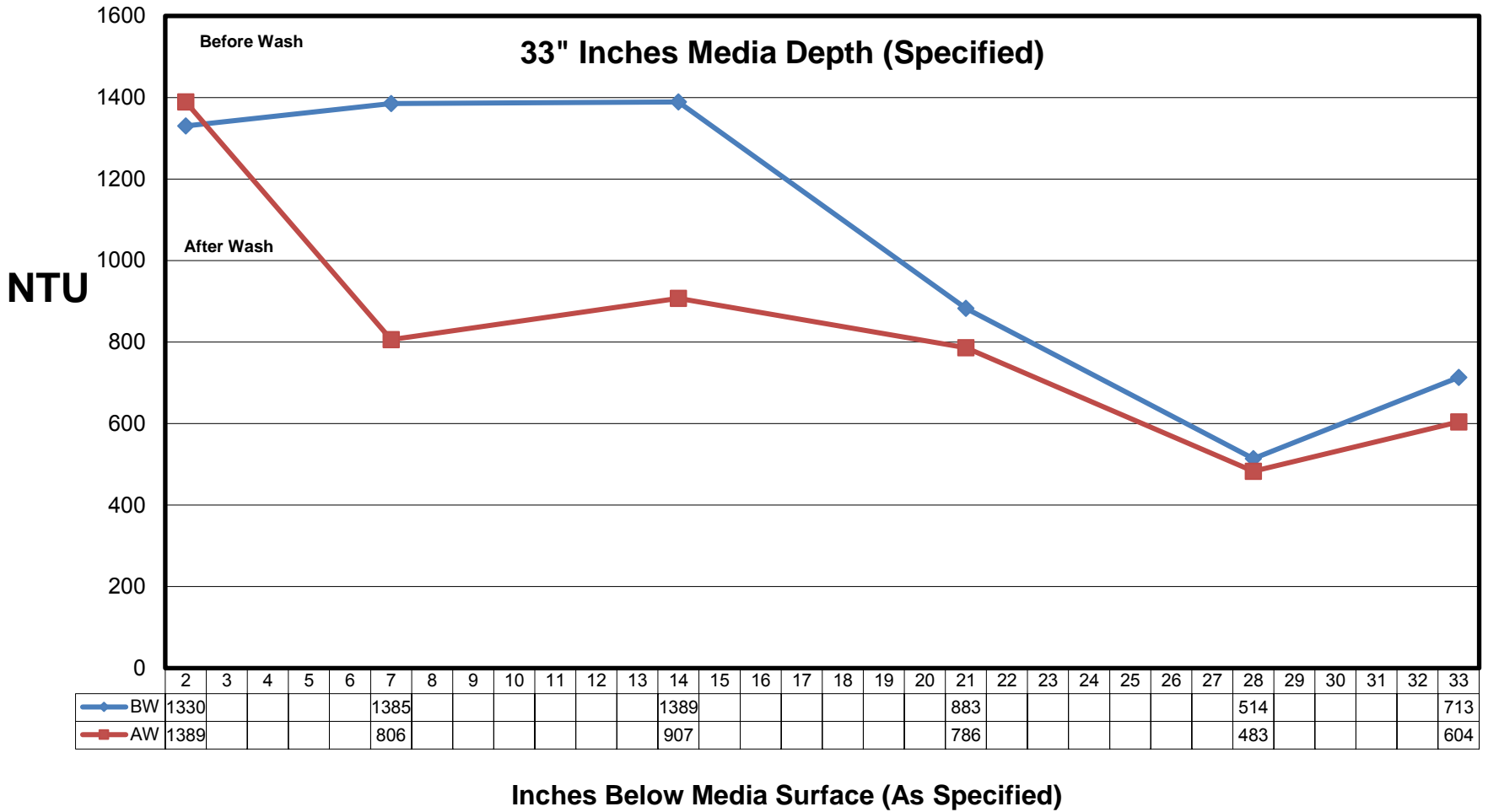
Date Calibrated: 4/1/2018



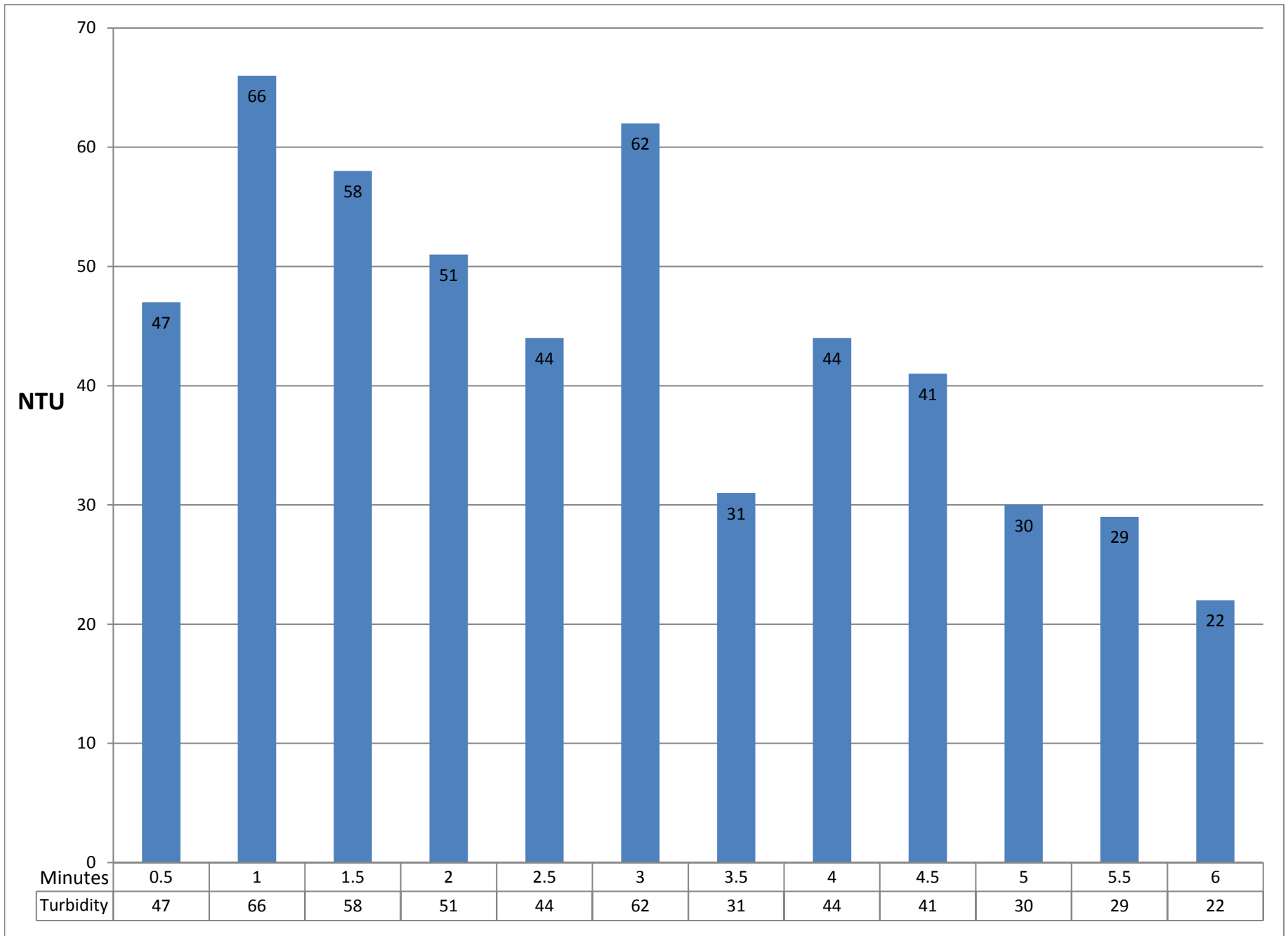
Remarks: Sieve Analysis

Patterson Pass WTP
Flock Retention Analysis

Filter: 2B



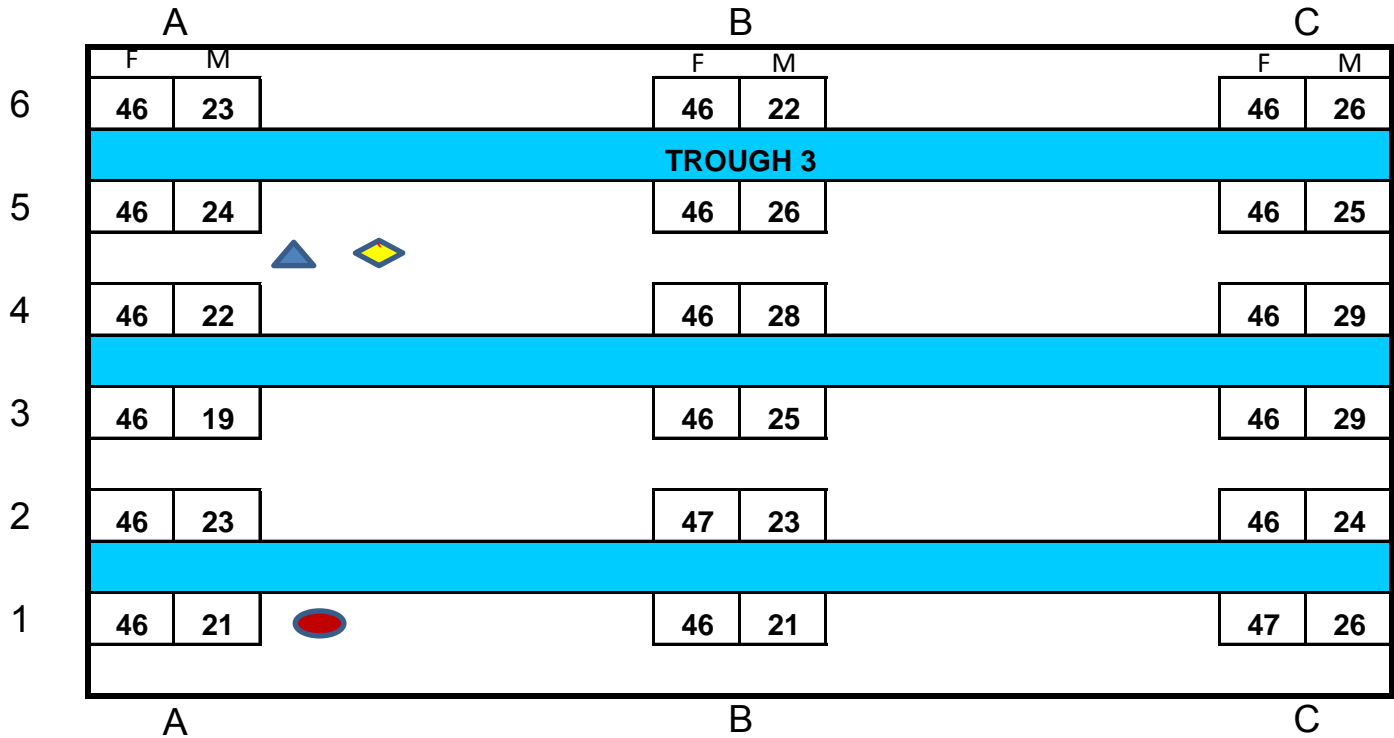
Patterson Pass WTP
2B



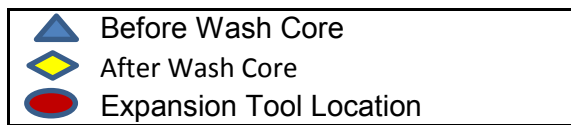
Minutes
(30 Second Intervals)

FILTER LAYOUT

Zone 7
Patterson Pass WTP
2B



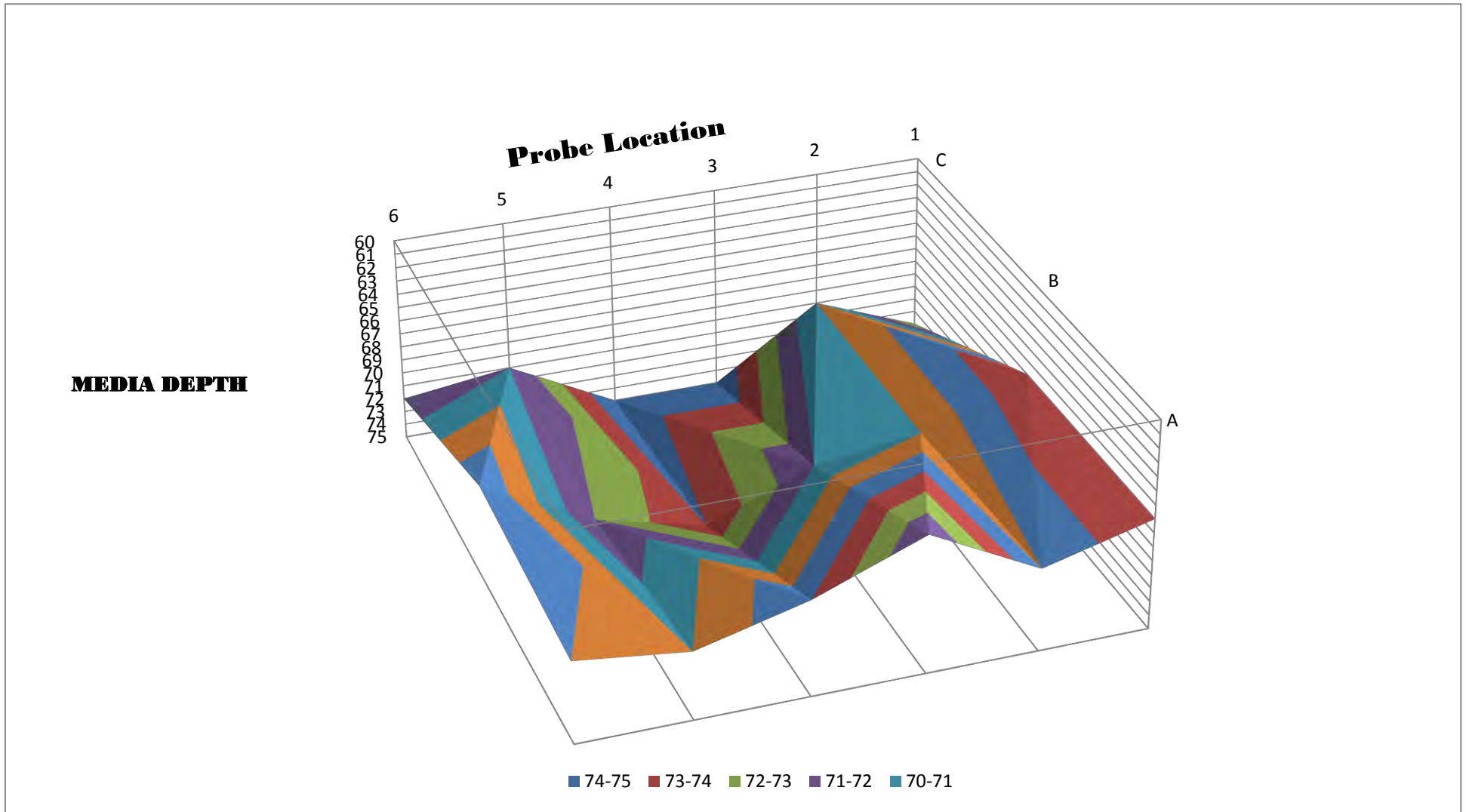
N



GRAVEL PROFILE

Zone 7
Patterson Pass WTP
2B

	1	2	3	4	5	6
A	67	69	65	68	70	69
B	67	70	71	74	72	68
C	73	70	75	75	71	72



FILTER 3A ANALYSIS

FILTER SURVEILLANCE

Filter Evaluation for: Zone 7 **Plant:** Patterson Pass WTP
Filter Type: Gravity **Contact:** Allan Dahlquist **Phone #** 925-786-5433
Filter Number: 3A **Inspector:** Isidro Martinez **Date:** 3/20/2018

Pre Backwash Inspection

Filter Surface: Media surface has a coating of mud but appears level.

Acceptable

Wall Condition: Coatings are stained but appear smooth and solid.

Acceptable

Mechanical System: Surface wash is complete and working as designed. Piping had minor rust. Troughs are level and in good condition. Freeboard to nozzle East side 8 inches and West side 12 inches.

Acceptable

Media Measurements

Freeboard Measurements: (Inches from lip to top of media)

	1	2	3	4	5	6
A	45	46	46	46	45	45
B	46	46	46	46	46	45
C	46	46	46	46	45	45

Media Depth: (Inches from top of media to gravel bed)

	1	2	3	4	5	6
A	29	31	24	25	27	29
B	25	25	25	25	25	26
C	23	23	26	22	24	28

Support Gravel: (Footprint in inches)

	1	2	3	4	5	6
A	74	77	70	71	72	74
B	71	71	71	71	71	71
C	69	69	72	68	69	73

Media Core Samples:**Yes**

	Specified (Inches)	Measured (Inches)
GAC/Anthracite:	<u>18</u>	<u>12</u>
Sand:	<u>12</u>	<u>10</u>
High Density Sand:	<u>3</u>	<u>0</u>
Total Depth:	<u>33</u>	<u>22</u>
Media Interface:	<u><2</u>	<u>3</u>

Backwash

General Observation: Backwash initiated smoothly. Backwash water was clear at end of cycle. Filter media was level and clean after cycle. Water samples every 30 seconds.

Acceptable

Media Expansion: 5 in 22.73%

Post Backwash**Media Core Samples ES-UC**

Effective Size

Uniformity Coefficient

	Specified	Actual	Specified	Actual
GAC/Anthracite:	<u>1.0-1.1</u>	<u>1.04</u>	<u><1.5</u>	<u>1.46</u>
Sand:	<u>.42-.52</u>	<u>0.58</u>	<u><1.5</u>	<u>1.24</u>
High Density Sand:	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>
Other:	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>
Sample Analysis Included	<u>Yes</u>			

ERS INDUSTRIAL SERVICES, INC.

Filter Media Analysis

Project: Zone 7 (3 Gravity Filters, Double Cell) Patterson Pass 2018

Sample No: ZN-3A-A#0001

Location: Livermore, CA

Material: Anthracite

Source: ERS Industrial Services, Inc

Date Sampled: 3/20/2018

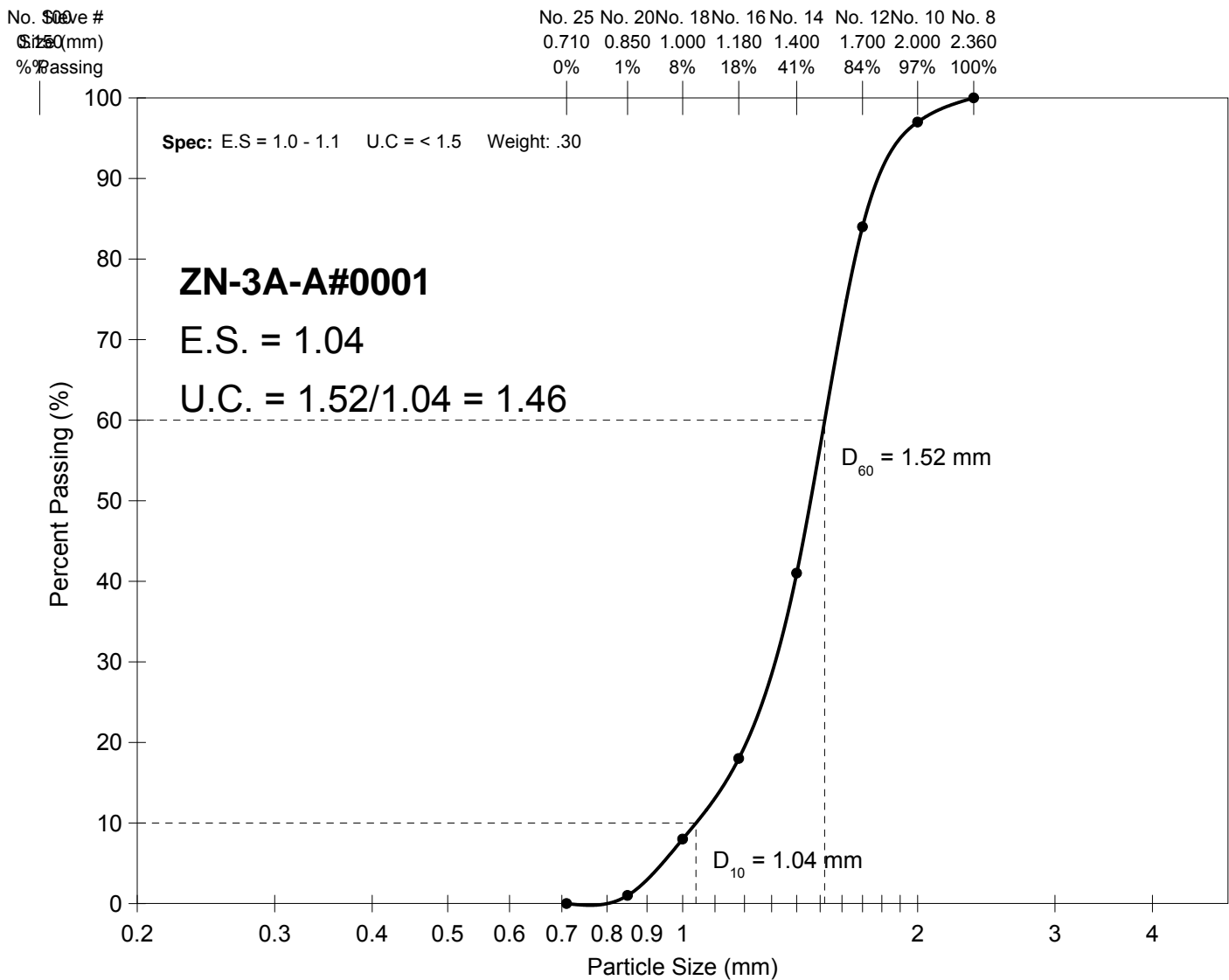
Sampled By: Ricky Lim

Date Tested: 4/3/2018

Tested By: Francisco G.

Sieve Set: A.S.T.M C134/CAL 202

Date Calibrated: 4/1/2018



Remarks: Sieve Analysis

ERS INDUSTRIAL SERVICES, INC.

Filter Media Analysis

Project: Zone 7 (3 Gravity Filters, Double Cell) Patterson Pass 2018

Sample No: ZN-3S-A#0001

Location: Livermore, CA

Material: Sand

Source: ERS Industrial Services, Inc

Date Sampled: 3/20/2018

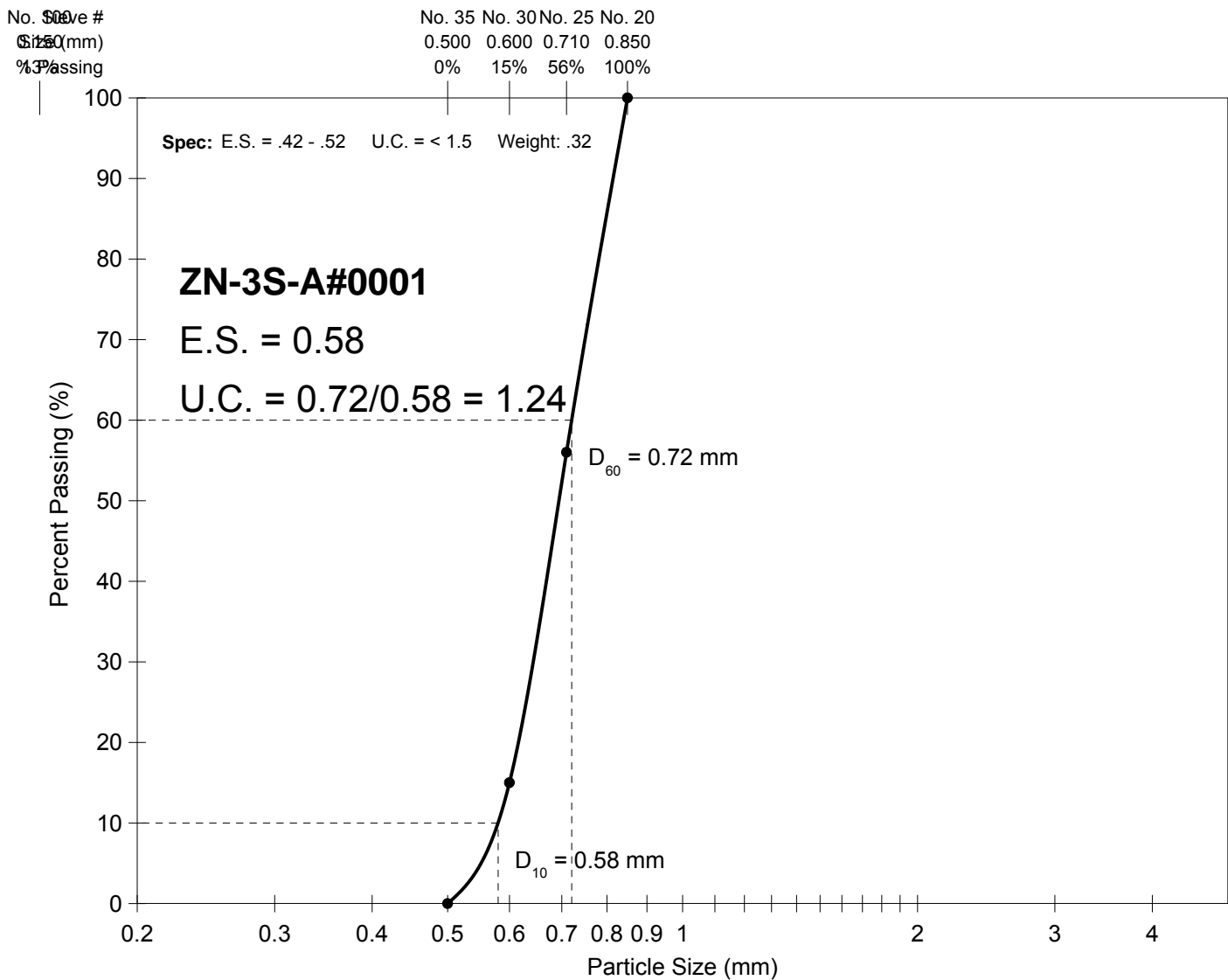
Sampled By: Ricky Lim

Date Tested: 4/3/2018

Tested By: Francisco G.

Sieve Set: A.S.T.M C134/CAL 202

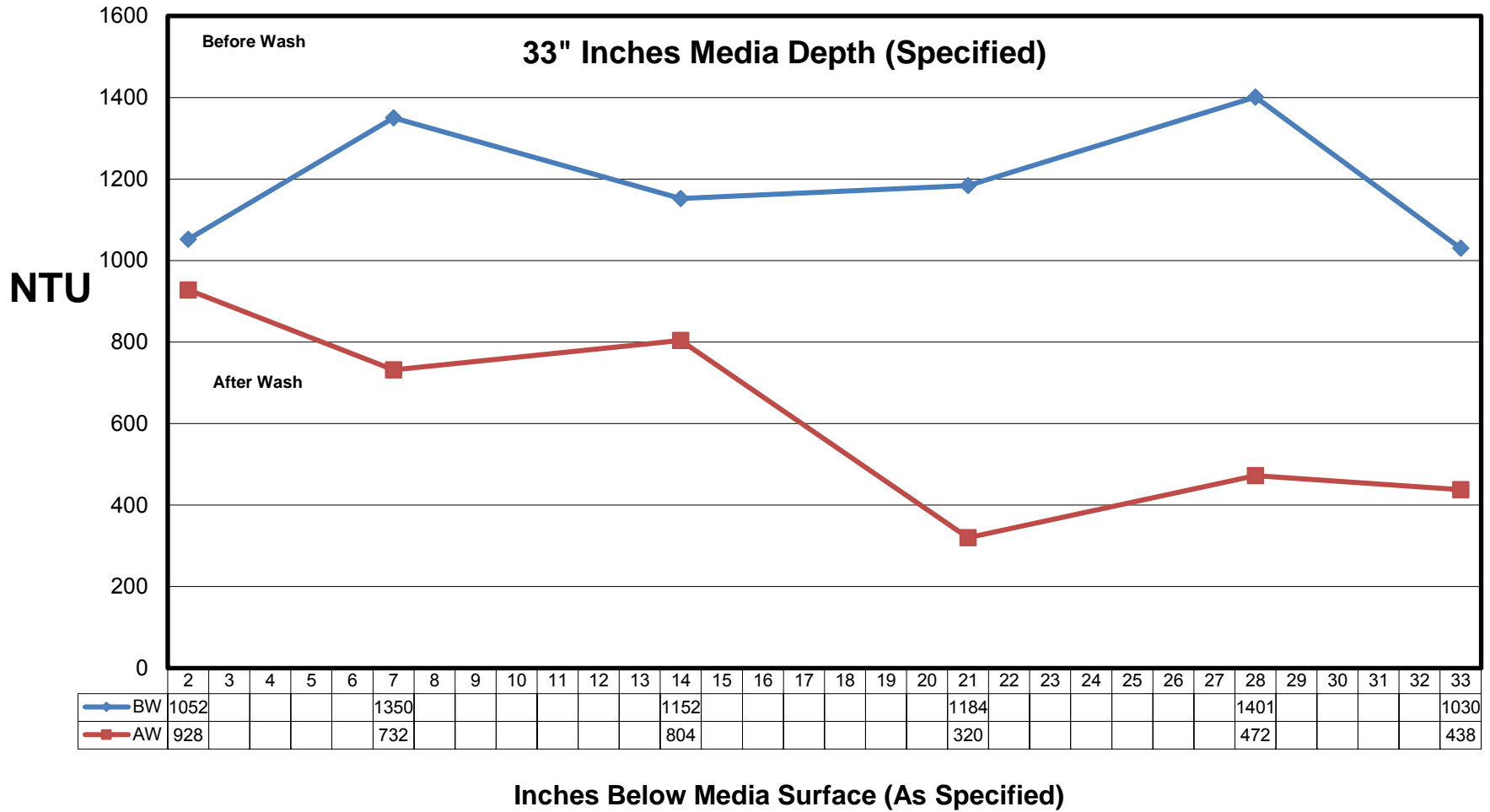
Date Calibrated: 4/1/2018



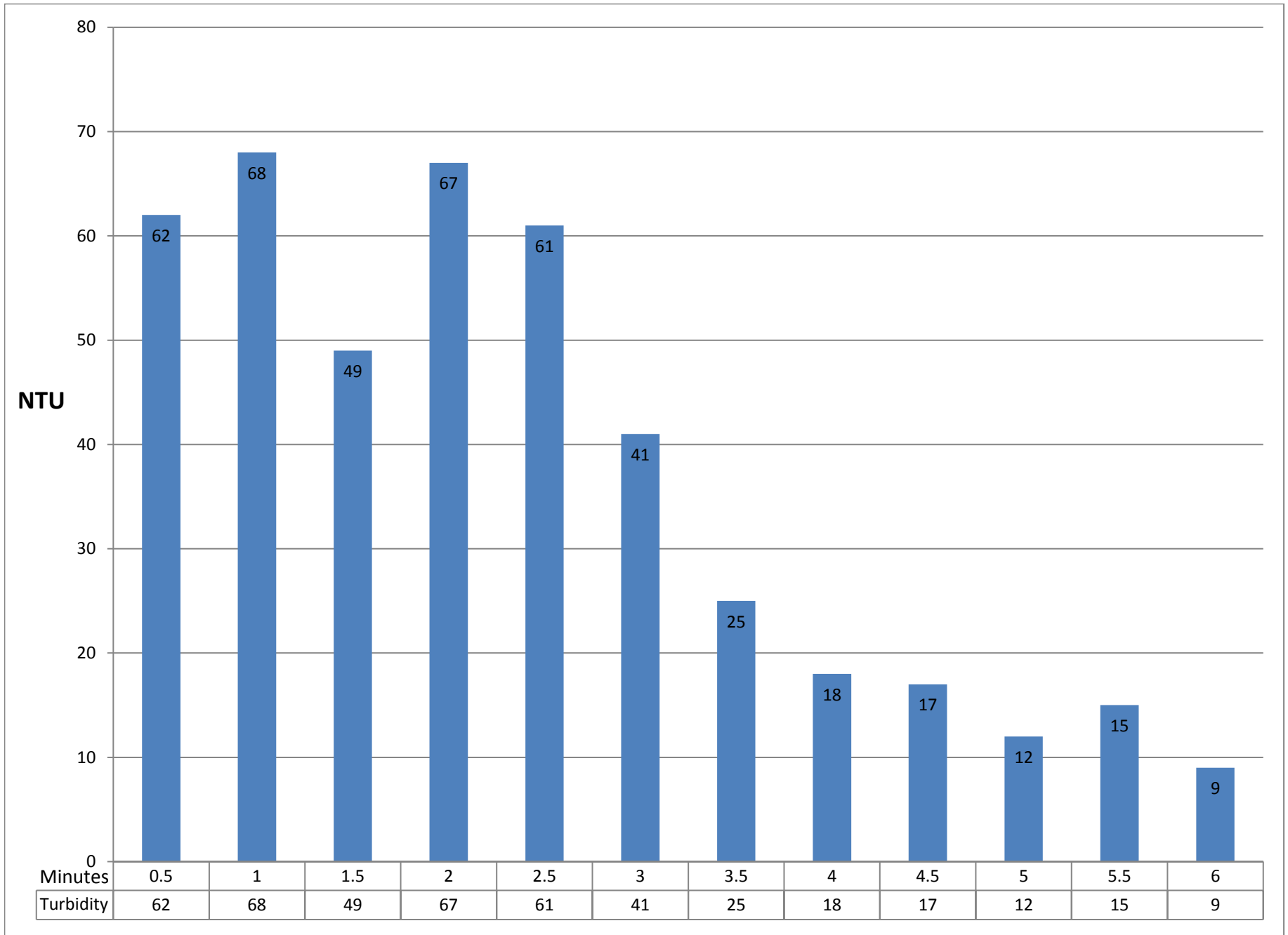
Remarks: Sieve Analysis

Patterson Pass WTP
Flock Retention Analysis

Filter: 3A



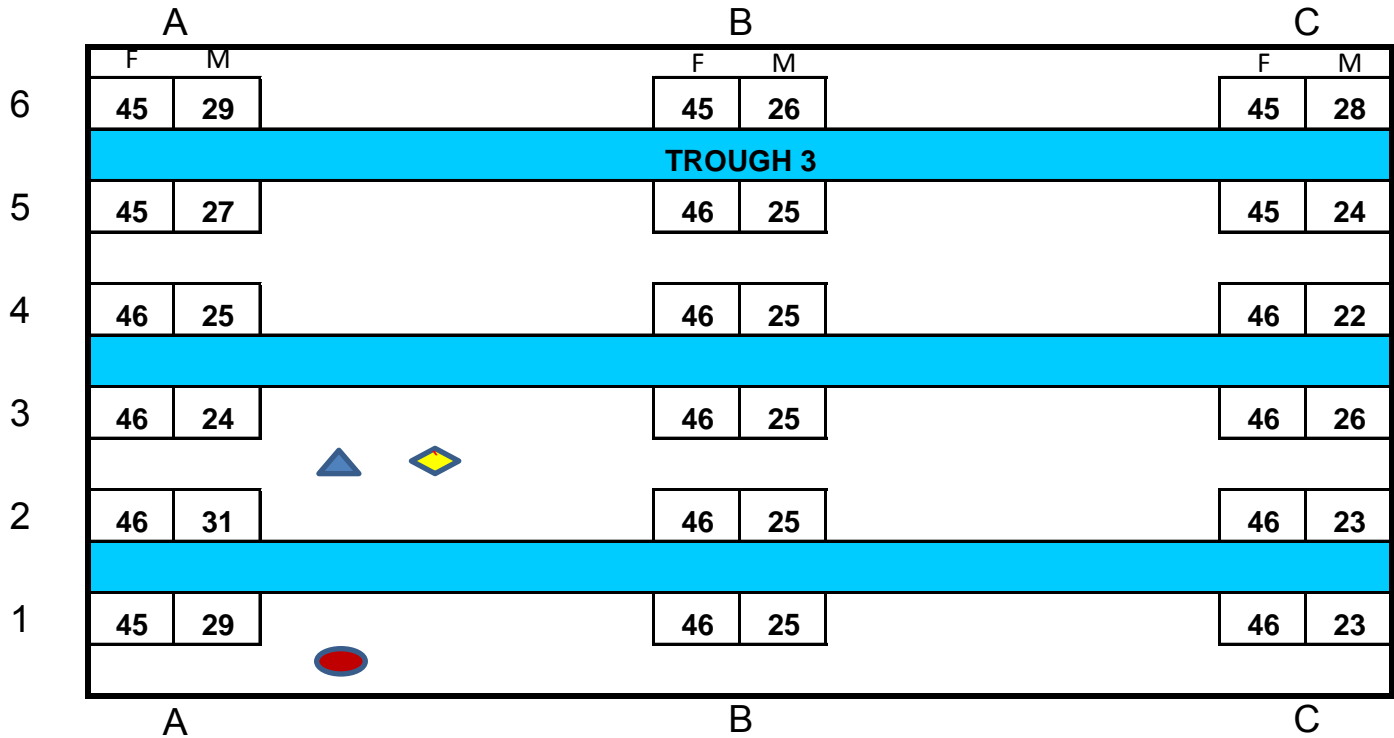
Patterson Pass WTP
3A






Minutes
(30 Second Intervals)

FILTER LAYOUT

Zone 7
Patterson Pass WTP
3A



N

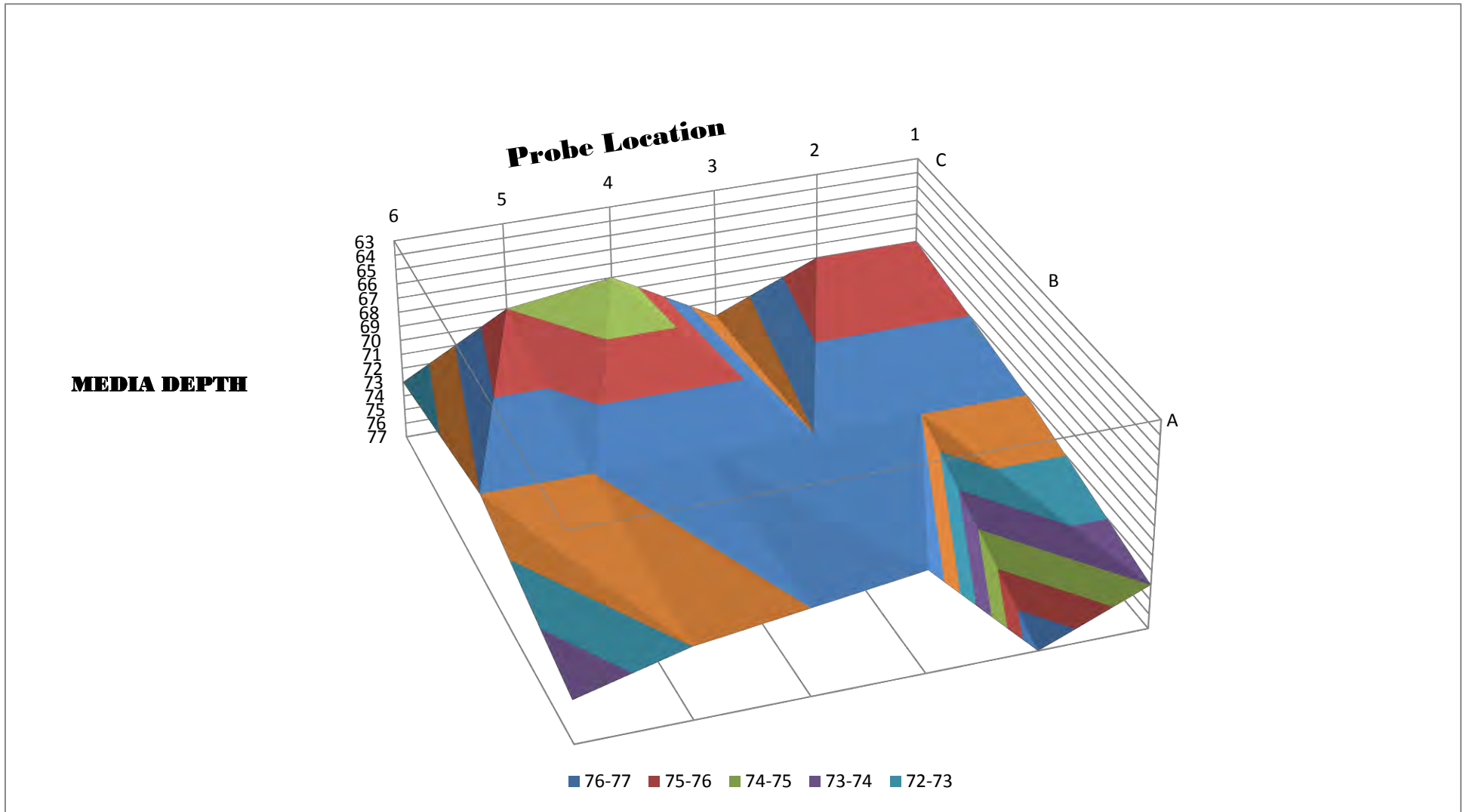
	Before Wash Core
	After Wash Core
	Expansion Tool Location



GRAVEL PROFILE

Zone 7
Patterson Pass WTP
3A

	1	2	3	4	5	6
A	74	77	70	71	72	74
B	71	71	71	71	71	71
C	69	69	72	68	69	73



FILTER 3B ANALYSIS

FILTER SURVEILLANCE

Filter Evaluation for: Zone 7 **Plant:** Patterson Pass WTP
Filter Type: Gravity **Contact:** Allan Dahlquist **Phone #** 925-786-5433
Filter Number: 3B **Inspector:** Isidro Martinez **Date:** 3/20/2018

Pre Backwash Inspection

Filter Surface: Media surface has a coating of mud but appears level.

Acceptable

Wall Condition: Coatings are stained but appear smooth and solid.

Acceptable

Mechanical System: Surface wash is complete and working as designed. Piping had minor rust. Troughs are level and in good condition. Freeboard to nozzle East side 10 inches and West side 12 inches.

Acceptable

Media Measurements

Freeboard Measurements: (Inches from lip to top of media)

	1	2	3	4	5	6
A	46	46	46	46	46	46
B	46	46	47	47	46	46
C	46	46	46	46	46	46

Media Depth: (Inches from top of media to gravel bed)

	1	2	3	4	5	6
A	25	26	24	19	27	26
B	24	28	26	24	25	25
C	27	26	28	24	25	25

Support Gravel: (Footprint in inches)

	1	2	3	4	5	6
A	71	72	70	65	73	72
B	70	74	73	71	71	71
C	73	72	74	70	71	71

Media Core Samples:**Yes**

	Specified (Inches)	Measured (Inches)
GAC/Anthracite:	<u>18</u>	<u>11</u>
Sand:	<u>12</u>	<u>13</u>
High Density Sand:	<u>3</u>	<u>0</u>
Total Depth:	<u>33</u>	<u>24</u>
Media Interface:	<u><2</u>	<u>3</u>

Backwash

General Observation: Backwash initiated smoothly. Backwash water was clear at end of cycle. Filter media was level and clean after cycle. Water samples every 30 seconds.

Acceptable

Media Expansion: 5 in 20.83%

Post Backwash**Media Core Samples ES-UC**

Effective Size

Uniformity Coefficient

	Specified	Actual	Specified	Actual
GAC/Anthracite:	<u>1.0-1.1</u>	<u>1.16</u>	<u><1.5</u>	<u>1.37</u>
Sand:	<u>.42-.52</u>	<u>0.62</u>	<u><1.5</u>	<u>1.27</u>
High Density Sand:	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>
Other:	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>
Sample Analysis Included	<u>Yes</u>			

ERS INDUSTRIAL SERVICES, INC.

Filter Media Analysis

Project: Zone 7 (3 Gravity Filters, Double Cell) Patterson Pass 2018

Sample No: ZN-3A-B#0001

Location: Livermore, CA

Material: Anthracite

Source: ERS Industrial Services, Inc

Date Sampled: 3/20/2018

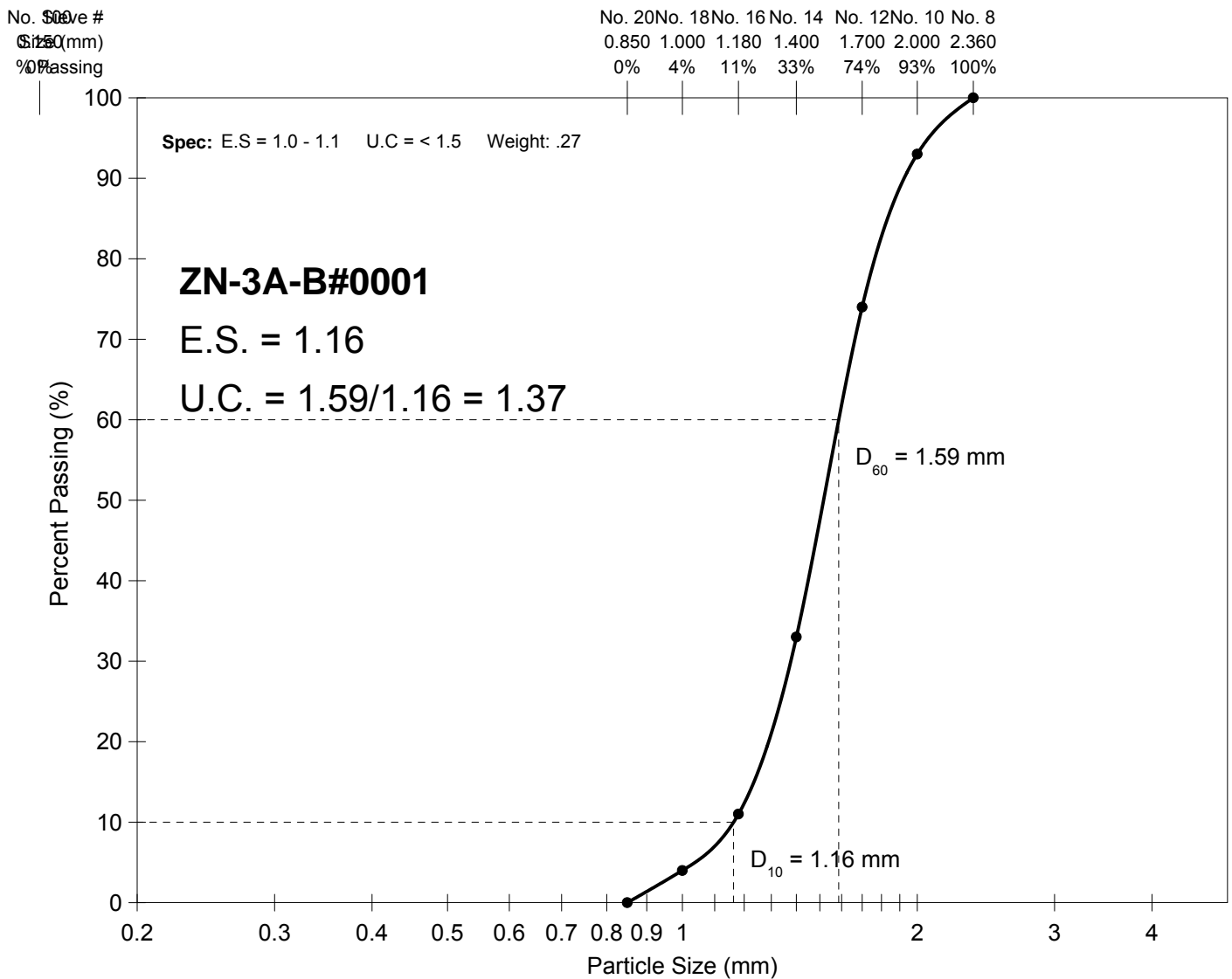
Sampled By: Ricky Lim

Date Tested: 4/3/2018

Tested By: Francisco G.

Sieve Set: A.S.T.M C134/CAL 202

Date Calibrated: 4/1/2018



Remarks: Sieve Analysis

ERS INDUSTRIAL SERVICES, INC.

Filter Media Analysis

Project: Zone 7 (3 Gravity Filters, Double Cell) Patterson Pass 2018

Sample No: ZN-3S-B#0001

Location: Livermore, CA

Material: Sand

Source: ERS Industrial Services, Inc

Date Sampled: 3/20/2018

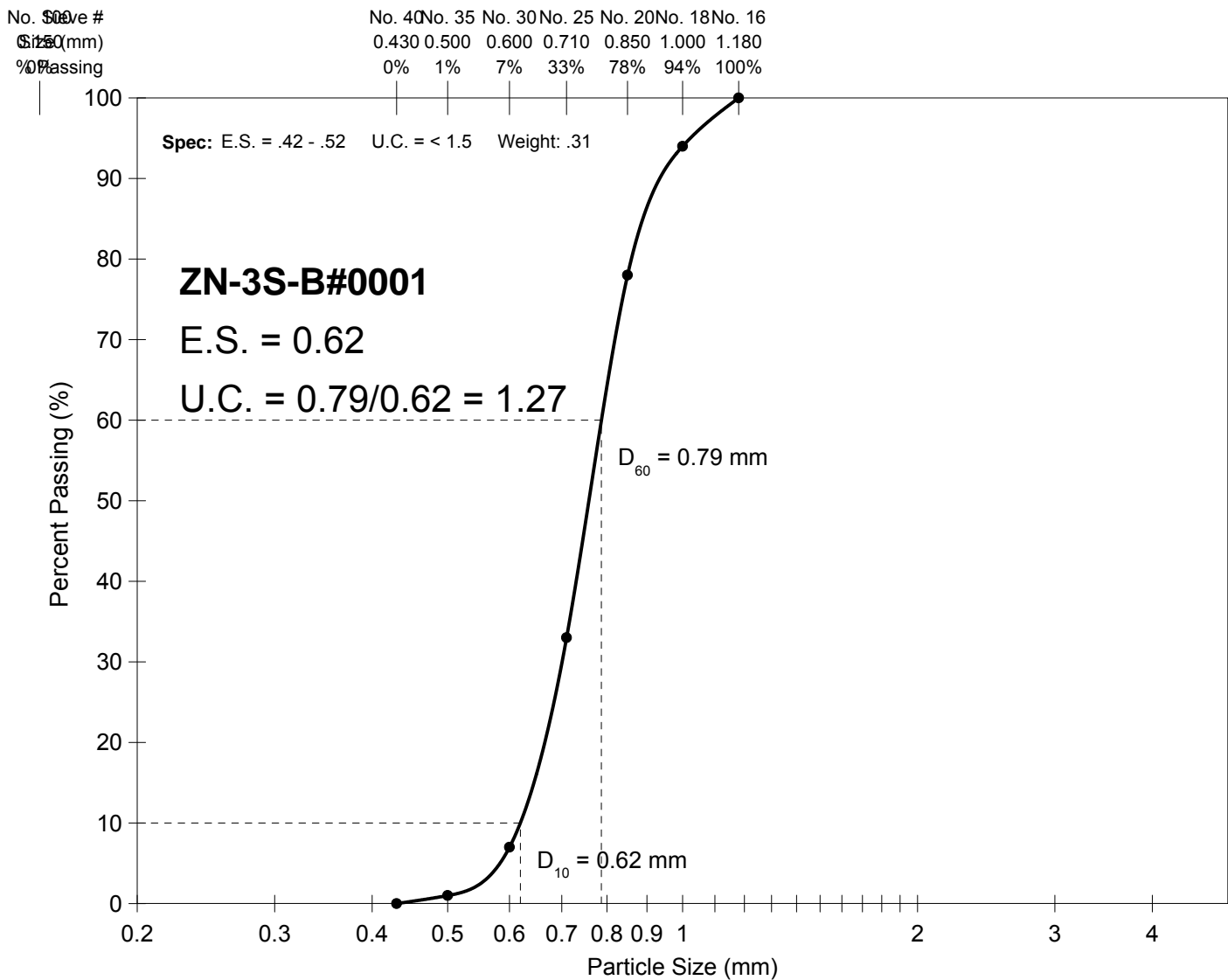
Sampled By: Ricky Lim

Date Tested: 4/3/2018

Tested By: Francisco G.

Sieve Set: A.S.T.M C134/CAL 202

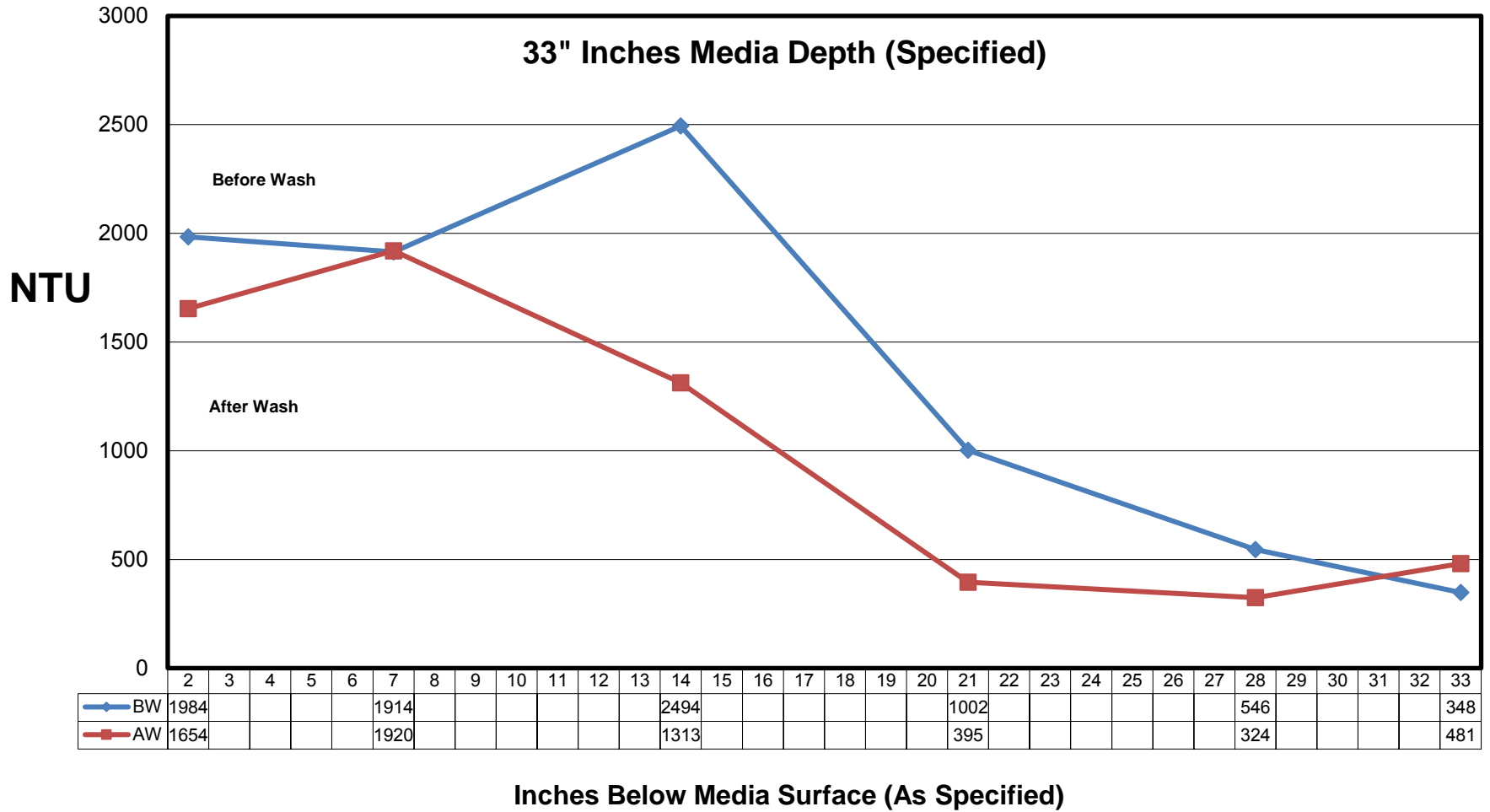
Date Calibrated: 4/1/2018



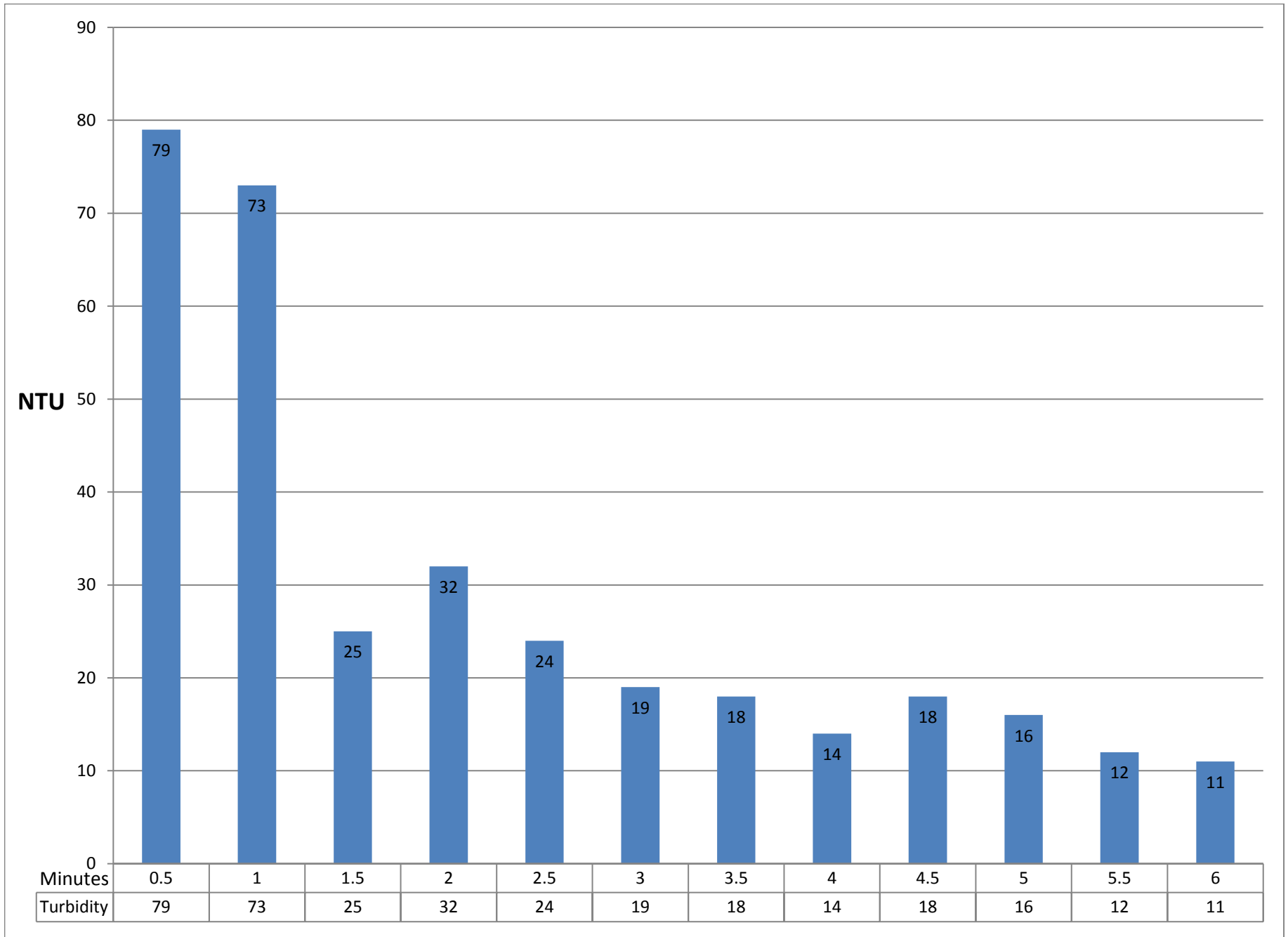
Remarks: Sieve Analysis

Patterson Pass WTP
Flock Retention Analysis

Filter: 3B



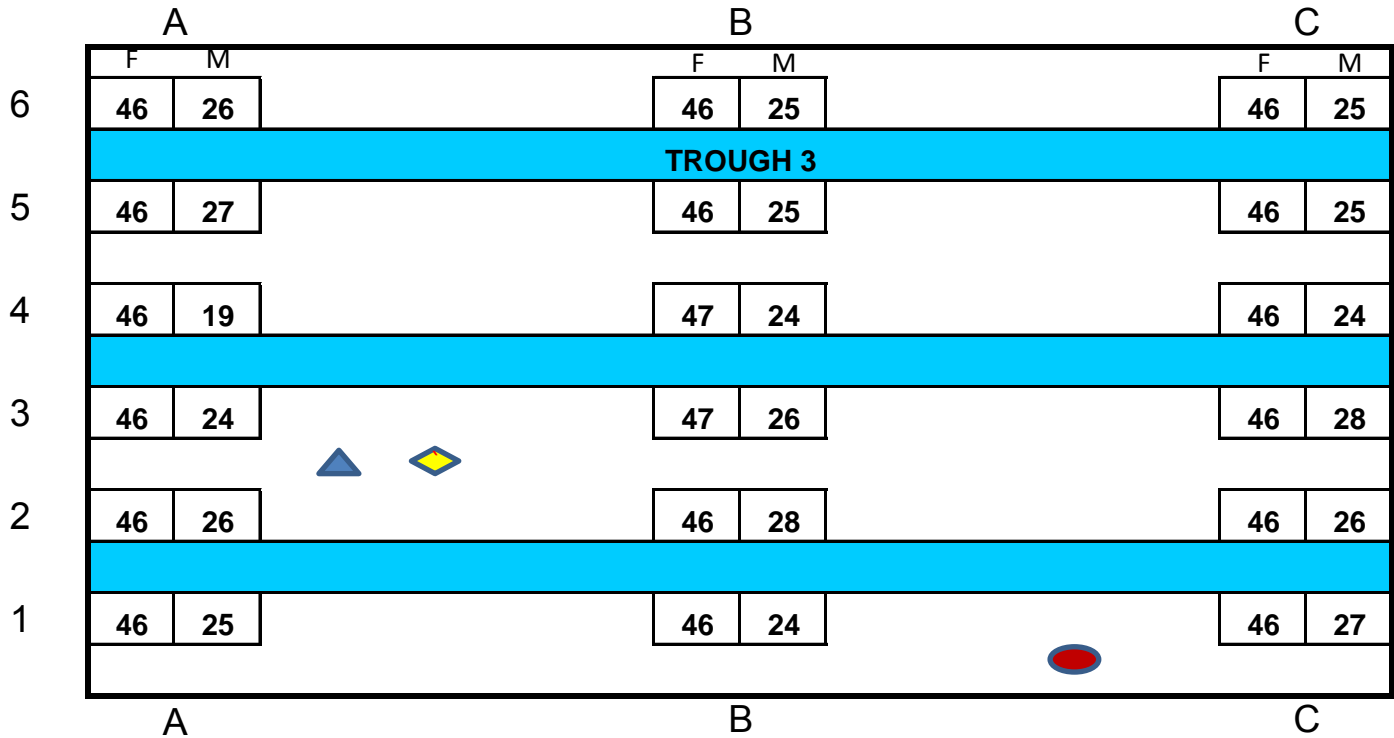
Patterson Pass WTP
3B






Minutes
(30 Second Intervals)

FILTER LAYOUT

Zone 7
Patterson Pass WTP
3B



N

	Before Wash Core
	After Wash Core
	Expansion Tool Location



GRAVEL PROFILE

Zone 7
Patterson Pass WTP
3B

	1	2	3	4	5	6
A	71	72	70	65	73	72
B	70	74	73	71	71	71
C	73	72	74	70	71	71

