Subsystem/ Function/ Feature Name:	EC Sensor							
Date Completed:	4/10/2018							
Performed By:	Thierno							
Tested By:	Thierno							
				Green - Passed	Red - Failed	Yellow - Not Completed		
Concluded Condition of meeting Engineering Specification								

I. TESTING SPECIFICATION

Specification Number	Importance	Source	Function	Specification	Unit of Measure	Ideal Value	Acceptable Rang	Comments
S4	3	PRP	System	conductivity level	PPM/EC or S/m	2 S/m 12.8 ppm	12.5 - 13	Ideal value would be 12.8

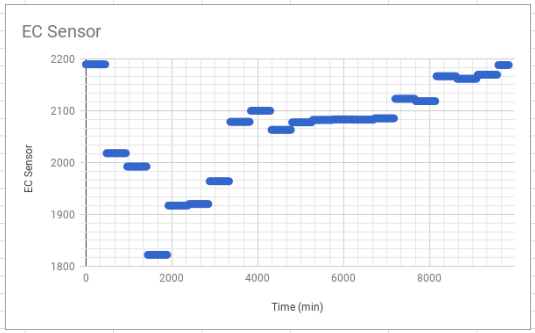
II. EQUIPMENT REQURIED

Specification Number	Equipment or Instrumentation required
S4	Water Resovoir, Nutrient Solution, Arduino Mega, Computer, Sensor

III. DATA COLLECTION STRATEGY

Specification Number	Data acquisition strategy
S4	Monitor conductivity of nutrient in the solution. Use three prong outlet to monitor the conductivity level using the arduino and the computer terminal. Leave conductivity sensor running in protoype overnight and confirm that the results do not change. Operating principle: PPM is calculated from the EC of a fluid, EC is the inverse of the electrical resistance of the fluid. We are estimating the EC or PPM of a fluid by measuring the resistance between two probes [The plug pins] when the plug is submerged in the liquid of interest.

V. Results



VI. Conclusions

Electrical Conductivity Sensor is accurate within 150 ppm. The sensor did not electroplate after continuously running for weeks

IV. Raw Data

Time(min)	E.C. (ppm)	Time(min)	E.C. (ppm)	Time (min)	E.C.(ppm)
0	2189.54	0	1891.02	0	1482.66
30	2189.54	30	1891.02	30	1482.66
60	2189.54	60	1891.02	60	1482.66
90	2189.54	90	1891.02	90	1482.66
120	2189.54	120	1891.02	120	1482.66
150	2189.54	150	1891.02	150	1482.66
180	2189.54	180	1891.02	180	1482.66
210	2189.54	210	1891.02	210	1482.66
240	2189.54	240	2062.35	240	1420.47
270	2189.54	270	2062.35	270	1420.47
300	2189.54	300	2062.35	300	1420.47
330	2189.54	330	2062.35	330	1420.47
360	2189.54	360	2062.35	360	1420.47
390	2189.54	390	2062.35	390	1420.47
420	2189.54	420	2062.35	420	1420.47
450	2189.54	450	2062.35	450	1420.47
480	2018.05	480	2064.01	480	1376.7
510	2018.05	510	2064.01	510	1376.7
540	2018.05	540	2064.01	540	1376.7
570	2018.05	570	2064.01	570	1376.7
600	2018.05	600	2064.01	600	1376.7
630	2018.05	630	2064.01	630	1376.7
660	2018.05	660	2064.01	660	1376.7
690	2018.05	690	2064.01	690	1376.7
720	2018.05	720	2087.52	720	1385.22
750	2018.05	750	2087.52	750	1385.22
780	2018.05	780	2087.52	780	1385.22
810	2018.05	810	2087.52	810	1385.22
840	2018.05	840	2087.52	840	1385.22
870	2018.05	870	2087.52	870	1385.22
900	2018.05	900	2087.52	900	1385.22
930	2018.05	930	2087.52	930	1385.22
960	1992.37	960	2091.68	960	1439.81
990	1992.37	990	2091.68	990	1439.81
1020	1992.37	1020	2091.68	1020	1439.81
1050	1992.37	1050	2091.68	1050	1439.81
1080	1992.37	1080	2091.68	1080	1439.81
1110	1992.37	1110	2091.68	1110	1439.81
1140	1992.37	1140	2091.68	1140	1439.81
1170	1992.37	1170	2091.68	1170	1439.81
1200	1992.37	1200	2084.98	1200	1427.44
1230	1992.37	1230	2084.98	1230	1427.44
1260	1992.37	1260	2084.98	1260	1427.44
1290	1992.37	1290	2084.98	1290	1427.44
1320	1992.37	1320	2084.98	1320	1427.44
1350	1992.37	1350	2084.98	1350	1427.44
1380	1992.37	1380	2084.98	1380	1427.44
1410	1992.37	1410	2084.98	1410	1427.44
1440	1822.04	1440	2100.33	1440	1373.31
1470	1822.04	1470	2100.33	1470	1373.31
1500	1822.04	1500	2100.33	1500	1373.31
1530	1822.04	1530	2100.33	1530	1373.31
1560	1822.04	1560	2100.33	1560	1373.31
1590	1822.04	1590	2100.33	1590	1373.31
1620	1822.04	1620	2100.33	1620	1373.31
1650	1822.04	1650	2100.33	1650	1373.31
1680	1822.04	1680	2114.80	1680	1383.51
1710	1822.04	1710	2114.80	1710	1383.51

1740	1822.04	1740	2114.80	1740	1383.51
1770	1822.04	1770	2114.80	1770	1383.51
1800	1822.04	1800	2114.80	1800	1383.51
1830	1822.04	1830	2114.80	1830	1383.51
1860	1822.04	1860	2114.80	1860	1383.51
1890	1822.04	1890	2114.80	1890	1383.51
1920	1917.16	1920	2120.01	1920	1438.03
1950	1917.16	1950	2120.01	1950	1438.03
1980	1917.16	1980	2120.01	1980	1438.03
2010	1917.16	2010	2120.01	2010	1438.03
2040	1917.16	2040	2120.01	2040	1438.03
2070	1917.16	2070	2120.01	2070	1438.03
2100	1917.16	2100	2120.01	2100	1438.03
2130	1917.16	2130	2120.01	2130	1438.03
2160	1917.16	2160	2118.91	2160	1439.81
2190	1917.16	2190	2118.91	2190	1439.81
2220	1917.16	2220	2118.91	2220	1439.81
2250	1917.16	2250	2118.91	2250	1439.81
2280	1917.16	2280	2118.91	2280	1439.81
2310	1917.16	2310	2118.91	2310	1439.81
2340	1917.16	2340	2118.91	2340	1439.81
2370	1917.16	2370	2118.91	2370	1439.81
2400	1919.98	2400	2129.73	2400	1386.94
2430	1919.98	2430	2129.73	2430	1386.94
2460	1919.98	2460	2129.73	2460	1386.94
2490	1919.98	2490	2129.73	2490	1386.94
2520	1919.98	2520	2129.73	2520	1386.94
2550	1919.98	2550	2129.73	2550	1386.94
2580	1919.98	2580	2129.73	2580	1386.94
2610	1919.98	2610	2129.73	2610	1386.94
2640	1919.98	2640	2134.92	2640	1373.31
2670	1919.98	2670	2134.92	2670	1373.31
2700	1919.98	2700	2134.92	2700	1373.31
2730	1919.98	2730	2134.92	2730	1373.31
2760	1919.98	2760	2134.92	2760	1373.31
2790	1919.98	Time(min)	E.C. (ppm)	2790	1373.31
2820	1919.98	0	1943.93	2820	1373.31
2850	1919.98	30	1943.93	2850	1373.31
2880	1963.97	60	1943.93	2880	1371.63
2910	1963.97	90	1943.93	2910	1371.63
2940	1963.97	120	1943.93	2940	1371.63
2970	1963.97	150	1943.93	2970	1371.63
3000	1963.97	180	1943.93	3000	1371.63
3030	1963.97	210	1943.93	3030	1371.63
3060	1963.97	240	2112.21	3060	1371.63
3090	1963.97	270	2112.21	3090	1371.63
3120	1963.97	300	2112.21	3120	1373.31
3150	1963.97	330	2112.21	3150	1373.31
3180	1963.97	360	2112.21	3180	1373.31
3210	1963.97	390	2112.21	3210	1373.31
3240	1963.97	420	2112.21	3240	1373.31
3270	1963.97	450	2112.21	3270	1373.31
3300	1963.97	480	2114.80	3300	1373.31
3330	1963.97	510	2114.80	3330	1373.31
3360	2078.63	540	2114.80	3360	1388.67
3390	2078.63	570	2114.80	3390	1388.67
3420	2078.63	600	2114.80	3420	1388.67
3450	2078.63	630	2114.80	3450	1388.67
3480	2078.63	660	2114.80	3480	1388.67
3510	2078.63	690	2114.80	3510	1388.67
3540	2078.63	720	2101.37	3540	1388.67
3570	2078.63	750	2101.37	3570	1388.67
3600	2078.63	780	2101.37	3600	1386.94
3630	2078.63	810	2101.37	3630	1386.94
3660	2078.63	840	2101.37	3660	1386.94
3690	2078.63	870	2101.37	3690	1386.94
3720	2078.63	900	2101.37	3720	1386.94
3750	2078.63	930	2101.37	3750	1386.94
3780	2078.63	960	2101.37	3780	1386.94
3810	2078.63	990	2101.37	3810	1386.94
3840	2099.85	1020	2101.37	3840	1386.94
3870	2099.85	1050	2101.37	3870	1386.94
3900	2099.85	1080	2101.37	3900	1386.94
3930	2099.85	1110	2101.37	3930	1386.94
3960	2099.85	1140	2101.37	3960	1386.94
3990	2099.85	1170	2101.37	3990	1386.94

											4020	2099.85	1200	2112.21	4020	1386.94			
											4050	2099.85	1230	2112.21	4050	1386.94			
											4080	2099.85	1260	2112.21	4080	1383.51			
											4110	2099.85	1290	2112.21	4110	1383.51			
											4140	2099.85	1320	2112.21	4140	1383.51			
											4170	2099.85	1350	2112.21	4170	1383.51			
											4200	2099.85	1380	2112.21	4200	1383.51			
											4230	2099.85	1410	2112.21	4230	1383.51			
											4260	2099.85	1440	2125.62	4260	1383.51			
											4290	2099.85	1470	2125.62	4290	1383.51			
											4320	2063.26	1500	2125.62	4320	1366.6			
											4350	2063.26	1530	2125.62	4350	1366.6			
											4380	2063.26	1560	2125.62	4380	1366.6			
											4410	2063.26	1590	2125.62	4410	1366.6			
											4440	2063.26	1620	2125.62	4440	1366.6			
											4470	2063.26	1650	2125.62	4470	1366.6			
											4500	2063.26	1680	2150.94	4500	1366.6			
											4530	2063.26	1710	2150.94	4530	1366.6			
											4560	2063.26	1740	2150.94	4560	1417.01			
											4590	2063.26	1770	2150.94	4590	1417.01			
											4620	2063.26	1800	2150.94	4620	1417.01			
											4650	2063.26	1830	2150.94	4650	1417.01			
											4680	2063.26	1860	2150.94	4680	1417.01			
											4710	2063.26	1890	2150.94	4710	1417.01			
											4740	2063.26	1920	2122.62	4740	1417.01			
											4770	2063.26	1950	2122.62	4770	1417.01			
											4800	2077.63	1980	2122.62	4800	1375			
											4830	2077.63	2010	2122.62	4830	1375			
											4860	2077.63	2040	2122.62	4860	1375			
											4890	2077.63	2070	2122.62	4890	1375			
											4920	2077.63	2100	2122.62	4920	1375			
											4950	2077.63	2130	2122.62	4950	1375			
											4980	2077.63	2160	2142.51	4980	1375			
											5010	2077.63	2190	2142.51	5010	1375			
											5040	2077.63	2220	2142.51	5040	1381.8			
											5070	2077.63	2250	2142.51	5070	1381.8			
											5100	2077.63	2280	2142.51	5100	1381.8			
											5130	2077.63	2310	2142.51	5130	1381.8			
											5160	2077.63	2340	2142.51	5160	1381.8			
											5190	2077.63	2370	2142.51	5190	1381.8			
											5220	2077.63	2400	2169.31	5220	1381.8			
											5250	2077.63	2430	2169.31	5250	1381.8			
											5280	2082.28	2460	2169.31	5280	1375			
											5310	2082.28	2490	2169.31	5310	1375			
											5340	2082.28	2520	2169.31	5340	1375			
											5370	2082.28	2550	2169.31	5370	1375			
											5400	2082.28	2580	2169.31	5400	1375			
											5430	2082.28	2610	2169.31	5430	1375			
											5460	2082.28	2640	2186.80	5460	1375			
											5490	2082.28	2670	2186.80	5490	1375			
											5520	2082.28	2700	2186.80	5520	1369.95			
											5550	2082.28	2730	2186.80	5550	1369.95			
											5580	2082.28	2760	2186.80	5580	1369.95			
											5610	2082.28	2790	2186.80	5610	1369.95			
											5640	2082.28	2820	2186.80	5640	1369.95			
											5670	2082.28	2850	2186.80	5670	1369.95			
											5700	2082.28	2880	2181.58	5700	1369.95			
											5730	2082.28	2910	2181.58	5730	1369.95			
											5760	2083.37	2940	2181.58	5760	1359.95			
											5790	2083.37	2970	2181.58	5790	1359.95			
											5820	2083.37	3000	2181.58	5820	1359.95			
											5850	2083.37	3030	2181.58	5850	1359.95			
											5880	2083.37	3060	2181.58	5880	1359.95			
											5910	2083.37	3090	2181.58	5910	1359.95			
											5940	2083.37	3120	2193.59	5940	1359.95			
											5970	2083.37	3150	2193.59	5970	1359.95			
											6000	2083.37	3180	2193.59	6000	1361.61			
											6030	2083.37	3210	2193.59	6030	1361.61			
											6060	2083.37	3240	2193.59	6060	1361.61			
											6090	2083.37	3270	2193.59	6090	1361.61			
											6120	2083.37	3300	2193.59	6120	1361.61			
											6150	2083.37	3330	2193.59	6150	1361.61			
											6180	2083.37	3360	2220.50	6180	1361.61			
											6210	2083.37	3390	2220.50	6210	1361.61			
											6240	2082.77	3420	2220.50	6240	1423.95			
											6270	2082.77	3450	2220.50	6270	1423.95			

6300	2082.77	3480	2220.50	6300	1423.95
6330	2082.77	3510	2220.50	6330	1423.95
6360	2082.77	3540	2220.50	6360	1423.95
6390	2082.77	3570	2220.50	6390	1423.95
6420	2082.77	3600	2172.00	6420	1423.95
6450	2082.77	3630	2172.00	6450	1423.95
6480	2082.77	3660	2172.00	6480	1438.03
6510	2082.77	3690	2172.00	6510	1438.03
6540	2082.77	3720	2172.00	6540	1438.03
6570	2082.77	3750	2172.00	6570	1438.03
6600	2082.77	3780	2172.00	6600	1438.03
6630	2082.77	3810	2172.00	6630	1438.03
6660	2082.77	3840	2178.82	6660	1438.03
6690	2082.77	3870	2178.82	6690	1438.03
6720	2085.35	3900	2178.82	6720	1376.7
6750	2085.35	3930	2178.82	6750	1376.7
6780	2085.35	3960	2178.82	6780	1376.7
6810	2085.35	3990	2178.82	6810	1376.7
6840	2085.35	4020	2178.82	6840	1376.7
6870	2085.35	4050	2178.82	6870	1376.7
6900	2085.35	4080	2219.52	6900	1376.7
6930	2085.35	4110	2219.52	6930	1376.7
6960	2085.35	4140	2219.52	6960	1373.31
6990	2085.35	4170	2219.52	6990	1373.31
7020	2085.35	4200	2219.52	7020	1373.31
7050	2085.35	4230	2219.52	7050	1373.31
7080	2085.35	4260	2219.52	7080	1373.31
7110	2085.35	4290	2219.52	7110	1373.31
7140	2085.35	4320	2200.31	7140	1373.31
7170	2085.35	4350	2200.31	7170	1373.31
7200	2123.03	4380	2200.31	7200	1371.63
7230	2123.03	4410	2200.31	7230	1371.63
7260	2123.03	4440	2200.31	7260	1371.63
7290	2123.03	4470	2200.31	7290	1371.63
7320	2123.03	4500	2200.31	7320	1371.63
7350	2123.03	4530	2200.31	7350	1371.63
7380	2123.03	4560	2227.23	7380	1371.63
7410	2123.03	4590	2227.23	7410	1371.63
7440	2123.03	4620	2227.23	7440	1373.31
7470	2123.03	4650	2227.23	7470	1373.31
7500	2123.03	4680	2227.23	7500	1373.31
7530	2123.03	4710	2227.23	7530	1373.31
7560	2123.03	4740	2227.23	7560	1373.31
7590	2123.03	4770	2227.23	7590	1373.31
7620	2123.03	4800	2223.49	7620	1373.31
7650	2123.03	4830	2223.49	7650	1373.31
7680	2118.52	4860	2223.49	7680	1381.8
7710	2118.52	4890	2223.49	7710	1381.8
7740	2118.52	4920	2223.49	7740	1381.8
7770	2118.52	4950	2223.49	7770	1381.8
7800	2118.52	4980	2223.49	7800	1381.8
7830	2118.52	5010	2223.49	7830	1381.8
7860	2118.52	5040	2209.77	7860	1381.8
7890	2118.52	5070	2209.77	7890	1381.8
7920	2118.52	5100	2209.77	7920	1386.94
7950	2118.52	5130	2209.77	7950	1386.94
7980	2118.52	5160	2209.77	7980	1386.94
8010	2118.52	5190	2209.77	8010	1386.94
8040	2118.52	5220	2209.77	8040	1386.94
8070	2118.52	5250	2209.77	8070	1386.94
8100	2118.52	5280	2224.72	8100	1386.94
8130	2118.52	5310	2224.72	8130	1386.94
8160	2166.63	5340	2224.72	8160	1439.81
8190	2166.63	5370	2224.72	8190	1439.81
8220	2166.63	5400	2224.72	8220	1439.81
8250	2166.63	5430	2224.72	8250	1439.81
8280	2166.63	5460	2224.72	8280	1439.81
8310	2166.63	5490	2224.72	8310	1439.81
8340	2166.63	5520	2262.72	8340	1439.81
8370	2166.63	5550	2262.72	8370	1439.81
8400	2166.63	5580	2262.72	8400	1375
8430	2166.63	5610	2262.72	8430	1375
8460	2166.63	5640	2262.72	8460	1375
8490	2166.63	5670	2262.72	8490	1375
8520	2166.63	5700	2262.72	8520	1375
8550	2166.63	5730	2262.72	8550	1375

											8580	2166.63	5760	2327.84	8580	1375			
											8610	2166.63	5790	2327.84	8610	1375			
											8640	2161.74	5820	2327.84	8640	1373.31			
											8670	2161.74	5850	2327.84	8670	1373.31			
											8700	2161.74	5880	2327.84	8700	1373.31			
											8730	2161.74	5910	2327.84	8730	1373.31			
											8760	2161.74	5940	2327.84	8760	1373.31			
											8790	2161.74	5970	2327.84	8790	1373.31			
											8820	2161.74	6000	2320.01	8820	1373.31			
											8850	2161.74	6030	2320.01	8850	1373.31			
											8880	2161.74	6060	2320.01	8880	1390.39			
											8910	2161.74	6090	2320.01	8910	1390.39			
											8940	2161.74	6120	2320.01	8940	1390.39			
											8970	2161.74	6150	2320.01	8970	1390.39			
											9000	2161.74	6180	2320.01	9000	1390.39			
											9030	2161.74	6210	2320.01	9030	1390.39			
											9060	2161.74	6240	2283.47	9060	1390.39			
											9090	2161.74	6270	2283.47	9090	1390.39			
											9120	2169.39	6300	2283.47	9120	1388.67			
											9150	2169.39	6330	2283.47	9150	1388.67			
											9180	2169.39	6360	2283.47	9180	1388.67			
											9210	2169.39	6390	2283.47	9210	1388.67			
											9240	2169.39	6420	2283.47	9240	1388.67			
											9270	2169.39	6450	2283.47	9270	1388.67			
											9300	2169.39	6480	2320.75	9300	1388.67			
											9330	2169.39	6510	2320.75	9330	1388.67			
											9360	2169.39	6540	2320.75	9360	1397.34			
											9390	2169.39	6570	2320.75	9390	1397.34			
											9420	2169.39	6600	2320.75	9420	1397.34			
											9450	2169.39	6630	2320.75	9450	1397.34			
											9480	2169.39	6660	2320.75	9480	1397.34			
											9510	2169.39	6690	2320.75	9510	1397.34			
											9540	2169.39	6720	2328.53	9540	1397.34			
											9570	2169.39	6750	2328.53	9570	1397.34			
											9600	2188.16	6780	2328.53	9600	1386.94			
											9630	2188.16	6810	2328.53	9630	1386.94			
											9660	2188.16	6840	2328.53	9660	1386.94			
											9690	2188.16	6870	2328.53	9690	1386.94			
											9720	2188.16	6900	2328.53	9720	1386.94			
											9750	2188.16	6930	2328.53	9750	1386.94			
											9780	2188.16	6960	2347.75	9780	1386.94			
											9810	2188.16	6990	2347.75	9810	1386.94			
											9840	2188.16	7020	2347.75	9840	1380.09			
															9870	1380.09			
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