REHOBOTH CHRISTIAN COLLEGE – KENWICK
2021 ANNUAL COMPLIANCE REPORT
MINISTERIAL STATEMENT 780

PREPARED FOR:

ASSOCIATION FOR CHRISTIAN EDUCATION

REHOBOTH
CHRISTIAN COLLEGE

MARCH 2021

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MINISTERIAL STATEMENT 780
2021 ANNUAL COMPLIANCE REPORT

Distribution List:

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Office of Environmental Protection Authority	Compliance Officer	[02]	5 March 2021

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Draft Report	Sue Brand	Peter Shipley	4 March 2021
Final Report	Sue Brand	Peter Shipley	5 March 2021

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1. INTRODUCTION

Rehoboth Christian College (Rehoboth) is located at 92 Kenwick Road, Kenwick, within the City of Gosnells (Figure 1). It is owned and operated by the Association for Christian Education Inc. (the Proponent), who submitted a referral to the Environmental Protection Authority (EPA) under Part IV of the *Environmental Protection Act* 1986 (WA) (EP Act) due to the potential impacts on flora and wetlands within the school boundary from proposed extensions to the school. The EPA issued Bulletin 1249 in March 2007 indicating that the assessment level for the project was 'assessment on referral information' (ARI). The then Office of the Environmental Protection Authority (OEPA) published Ministerial Statement 780 on 19 January 2009 indicating the project could proceed.

MBS Environmental (MBS) was commissioned by Rehoboth on behalf of the Proponent in February 2021 to prepare and submit this, the tenth Annual Compliance Report as required by Condition M4.1 of Ministerial Statement 780 and will report on the period 20 January 2020 to 19 January 2021. Due to a delay in the preparation of this document, it was submitted to the EPA on 05 March 2021. It provides information relating to compliance with conditions detailed on Ministerial Statement 780 as well as commitments documented in the Proponent's commitments as it relates to the post-construction phase of Stage 2 works within Lot 900 Brixton Street.

1.1 DEVELOPMENT SUMMARY

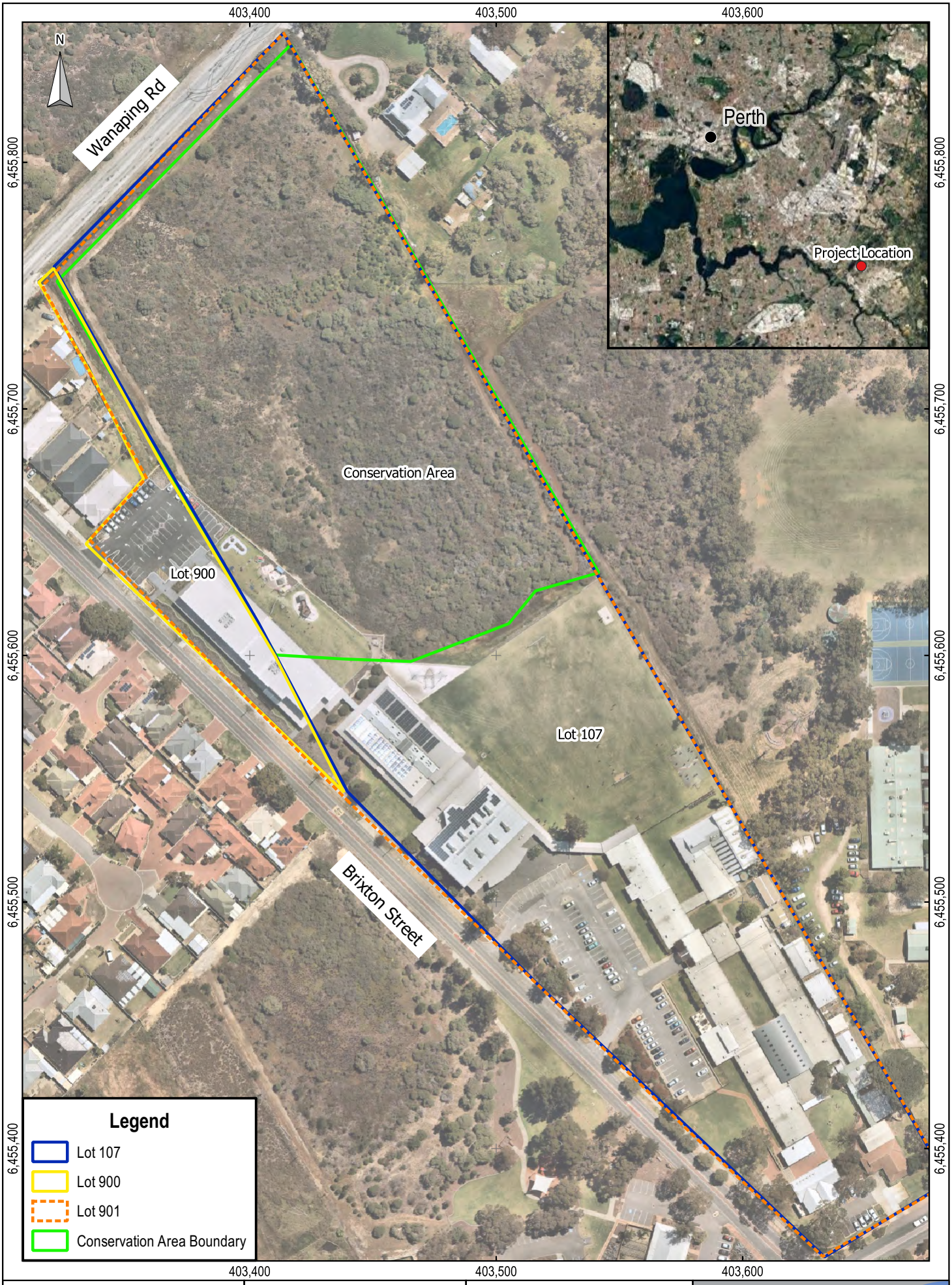
The development works undertaken by Rehoboth occurred in two phases, with Stage 1 including:

- Development of 1.0 ha of land that was characterised as a conservation category wetland (CCW) that included 0.60 ha of the threatened ecological community (TEC) claypan wetlands of the Swan Coastal Plain.
- Conservation management of 2.3 ha of two TECs in the remainder of the school lot, including:
  - Full rehabilitation of 0.18 ha of TEC claypan wetlands.
  - Partial rehabilitation of 0.66 ha of TEC claypan wetlands.
  - Preparation of a series of management plans for wetland and drainage areas.

All works associated with Stage 1 were completed by December 2015 and documented in the January 2016 Annual Compliance Report prepared by Natural Area Consulting Management Services (Natural Area) (2016) .

Stage 2 extension works included:

- development of the predominantly triangular area bounded by Brixton Street, Wanaping Road, and the wetland area (Lot 900 and a portion of Lot 107; these Lots have been amalgamated and are now known as Lot 901).
- clearing commenced on 26 April 2018, with construction commencing on 03 August 2018 and practical completion in May 2019.
- The original Drainage and Nutrient Management Plan and the Wetland Management Plan prepared by BlueSands Environmental were updated through preparation of an addendum and submitted to the EPA service unit on 12 March 2018, with approval for the addendums provided in a letter dated 11 November 2019. Note that the City of Gosnells required the development of updated stand-alone management plans as part of their development approval application (DAP) that were approved on 23 July 2018.



Scale: 1: 2,000
Original Size: A4
Aerial Photo Date: October 2019
Grid: GDA94 / MGA zone 50
0 25 50 m

Rehoboth Christian College
2021 Annual Compliance Report

Figure 1

Location and Site Context

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MBS ENVIRONMENTAL

W:\Rehoboth Christian College\GIS\Rehoboth Phase 2.qgz 04/03/2021 Location and Site Context

2. CURRENT STATUS

Stage 1 building commenced in February 2011 after the approval of the *Wetland Rehabilitation Plan*, the *Wetland Management Plan* and *Drainage and Nutrient Management Plan* in November 2010 (BlueSands, 2012, personal communication; OEPA, 2010, personal communication), and was completed later that year. Implementation of the *Wetland Revegetation Plan* is complete, as are the requirements of the *Drainage Management Plan* and the *Wetland Management Plan*, each of which were specific to Lot 107 (Stage 1). Updated versions of these plans were prepared by Natural Area (2018) and submitted to the Department of Water and Environmental Regulation (DWER), with a letter confirming their acceptability provided in November 2019.

Stage 2 development activities commenced in April 2018 when clearing of the native vegetation occurred and was completed in May 2019. Natural Area prepared and submitted the addendums to the Drainage and Nutrient Management Plan and the Wetland Management Plan, with approval being granted by the EPA on 11 November 2019. The provisions of the management plans that related to the management of vegetation, ground and surface water quality monitoring were implemented ahead of Stage 2 works commencing and will continue for three years post construction which is May 2022.

During 2020, Natural Area:

- Prepared and submitted the ninth Annual Compliance Report (Natural Area 2020a) and the fifth biennial Performance Review Report (Natural Area 2020b), which were both submitted to DWER on 20 January 2018.
- Requested and received confirmation from the EPA in January 2020 that no further biennial Performance Review Reports are required.
- Carried out groundwater quality monitoring activities at Rehoboth during the first quarter of 2020.
- Requested a temporary cessation of surface and groundwater quality monitoring for Quarters 2, 3, and 4 due to the COVID-19 pandemic that was approved on 26 May 2020.
- Commenced audit compliance activities.

In late February 2021, the consultant overseeing environmental matters, including compliance reporting, for Rehoboth changed to MBS, with this the tenth Annual Compliance Report being prepared by MBS drawing on information made available by Natural Area and Rehoboth, as well as drawing on personal knowledge of the site through previous employment with Natural Area.

3. COMPLIANCE

The Proponent continues to demonstrate overall compliance with approval conditions listed in Ministerial Statement 780 and the approved management plans, with the exception of submitting this Annual Compliance Report by the 19 January 2021 due date; this will be discussed further in Section 3.1.

3.1 NON-COMPLIANCES AND NON-CONFORMANCES

According to the Environmental Protection Authority (2014), a non-compliance is a failure to meet requirements specified within the Ministerial Statement, while a non-conformance is any deviation from procedures, programs and/or management actions described in an environmental management plan. One non-compliance occurred in relation to Condition M4.1 of Ministerial Statement 780 when the Annual Compliance Report was not submitted by 19 January 2021.

This situation occurred when a key person involved with overseeing environmental management activities, including preparing and submitting all required reports, for Rehoboth left the employ of Natural Area in November 2020 and commenced at MBS in December 2020. When Rehoboth realised the Annual Compliance Report had not been prepared, the Principal Environmental Scientist at MBS was contacted and engaged to recommence overseeing environmental matters and to prepare this document. The EPA was contacted to discuss the non-compliance and indicate that the document would be prepared and submitted by Friday 05 March 2021.

3.2 COMPLAINTS REGISTER

A complaints register as it relates to MS 780 has been prepared by Rehoboth and is kept at the front office. The complaints register includes the following provisions:

- Date.
- Complainant.
- Contact details.
- Nature of the complaint.
- Response.
- Date of response.

No complaints have been received since the register was prepared in 2012.

3.3 COMPLIANCE STATEMENT

This Annual Compliance Report provides verifiable evidence of compliance with required conditions outlined in Ministerial Statement 780 and endorsed actions and commitments outlined in proponent Management Plans. A Compliance Statement as per the Post Assessment Form (PAF) 2 is provided in Appendix 1 of this document.

4. ENVIRONMENTAL MONITORING AND RESEARCH

During the period 20 January 2020 – 19 January 2021, environmental monitoring and research was limited to that carried out during the first quarter of 2020 during the post -construction phase of the project due to the progression of the Covid-19 pandemic and the various restrictions that were implemented as a means of minimising its spread. Ground and surface water quality monitoring will recommence in quarter 1, 2021.

4.1 GROUNDWATER QUALITY MONITORING

Two of the three groundwater monitoring bores were installed by Hyd_2O in 2016 and were monitored during the first quarter of 2020. The groundwater quality monitoring laboratory certificate of analysis is provided in Appendix 2. A discussion on ground and surface water quality monitoring results relating to the pre-development and construction phases of the Stage 2 works are available in previous Annual Compliance Reports prepared by Natural Area.

4.1.1 Post-construction Monitoring

The post-construction groundwater quality sampling event that occurred in March 2020 means there have been a total of three sampling events since construction of Stage 2 at Rehoboth was completed in May 2019. Results were consistent with pre-development results, indicating it is not possible to associate construction activities with elevated nitrogen results (Table 1).

4.2 SURFACE WATER QUALITY MONITORING

No surface water quality sampling events occurred during winter/spring 2020 due the temporary cessation of these activities due to the Covid-19 pandemic; results from previous sampling events are provided in Table 2.

4.3 NUTRIENT ANALYSIS

Rehoboth continues to undertake nutrient analysis of the ovals prior to fertilising, with nutrient analysis results provided in Appendix 3.

Table 1: Groundwater Quality Monitoring Results

Parameter	Units	Guideline Values	Pre-development Monitoring														Development Monitoring						Post-development Monitoring								
			14 March 2017			24 May 2017			15 Dec 2017			28 March 2018			07 August 2018			30 November 2018			14 March 2019			08 August 2019			18 December 2019			17 March 2020		
			MB2	MB3	MB1	MB2	MB3	MB3	MB1	MB2	MB3	MB1	MB2	MB3	MB1	MB2	MB3	MB1	MB2	MB3	MB1	MB2	MB3	MB1	MB2a	MB3	MB1	MB2a	MB3	MB1	MB2a	MB3
pH	-	7.0 – 8.5	8.05	7.86	7.23	8.03	7.88	7.40	7.77	NA	NA	7.80	7.02	7.30	7.54	NA	6.79	7.75	NA	6.92	7.77	NA	6.98	7.86	7.51	7.58	7.90	7.61	7.43	7.51	7.18	NA
Electrical conductivity (EC)	µS/cm	300-1,500	8,740	3,240	3,400	8,190	3,710	4,460	5,910	NA	NA	7,420	6,150	4,530	842	NA	8,380	3,540	NA	3,360	6,710	NA	4,810	1,710	4,850	8,080	2,710	5,380	8,230	6,810	5,450	NA
Total suspended solids (TSS)	mg/L	NG	15	6	10,400	818	<5	18,000	56	NA	NA	34	45	36,700	10	NA	4,380	25	NA	3,260	120	NA	18,300	14	8	52	6	36	29	104	560	NA
Alkalinity as $CaCO_3$	mg/L	NG	26	8	67	42	12	65	29	NA	NA	29	43	105	13	NA	50	16	NA	32	40	NA	71	31	33	48	10	12	21	22	22	NA
Aluminium	mg/L	0.06	<0.01	<0.01	0.16	<0.01	<0.01	<0.01	<0.01	NA	NA	<0.01	<0.01	<0.01	<0.01	NA	<0.01	0.02	NA	0.01	<0.01	NA	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	NA
Arsenic	mg/L	0.013	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	NA	NA	<0.001	<0.001	<0.001	<0.001	NA	<0.001	0.001	NA	<0.001	0.001	NA	<0.001	<0.001	<0.001	0.002	0.002	0.001	0.003	<0.001	<0.001	NA
Iron	mg/L	NG	<0.05	<0.05	0.23	0.06	<0.05	<0.05	<0.05	NA	NA	<0.05	0.12	<0.05	0.12	NA	<0.05	1.06	NA	<0.05	0.33	NA	0.05	<0.05	<0.05	3.40	0.33	<0.05	1.63	0.19	<0.05	NA
Ammonia as N	mg/L	0.04	0.27	0.04	0.07	0.02	0.07	0.04	0.03	NA	NA	0.03	0.04	0.03	0.02	NA	0.10	0.05	NA	0.10	0.03	NA	0.03	0.14	0.05	<0.01	0.07	0.11	0.04	0.03	0.17	NA
Nitrite as N	mg/L	0.1	<0.01	<0.01	<0.01	0.12	<0.01	<0.01	0.06	NA	NA	0.09	0.02	<0.01	<0.01	NA	<0.01	<0.01	NA	<0.01	<0.01	NA	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.02	<0.01	NA
Nitrate as N	mg/L		<0.01	0.03	0.03	1.00	0.01	0.01	0.54	NA	NA	1.64	0.03	0.01	0.12	NA	0.02	0.12	NA	0.01	0.02	NA	<0.01	0.01	0.06	0.01	0.03	0.15	0.08	0.09	0.16	NA
Nitrite + nitrate as N	mg/L		<0.01	0.03	0.03	1.12	0.01	0.01	0.60	NA	NA	1.73	0.05	0.01	0.12	NA	0.02	0.12	NA	0.01	0.02	NA	<0.01	0.01	0.06	0.01	0.03	0.15	0.08	0.11	0.16	NA
Total Kjeldahl nitrogen	mg/L	NG	1.0	0.4	<1.0	0.6	0.4	38	0.8	NA	NA	1.0	0.2	1.7	0.8	NA	<0.5	1.4	NA	0.5	0.7	NA	1.2	1.2	0.2	1.4	0.7	0.2	0.7	0.8	0.7	NA
Total nitrogen as N	mg/L	1.5	1.0	0.4	<1.0	1.7	0.4	38	1.4	NA	NA	2.7	0.2	1.7	0.9	NA	<0.5	1.5	NA	0.5	0.7	NA	1.2	1.2	0.3	1.4	0.7	0.4	0.8	0.9	0.9	NA
Total phosphorous	mg/L	0.06	0.02	<0.01	0.31	0.09	0.02	2.68	0.07	NA	NA	0.02	<0.02	1.89	<0.01	NA	0.14	0.08	NA	0.15	0.03	NA	1.67	0.01	0.01	0.02	0.02	<0.01	0.02	0.03	0.03	NA

Indicates falls outside of adopted guideline value ranges.

a Default trigger values for wetlands in Southwest Australia as per Table 3.3.6 - 3.3.7 of ANZECC (2000)

b Default guideline values for 95% freshwater ecosystem protection as per ANZG (2018).

NA - Not analysed

NG - No applicable guideline value.

Table 2: Surface Water Quality Monitoring Results

Parameter	Units	ANZECC Guidelines Values	Pre-Development Monitoring		Development Monitoring 30 August 2018		Post-development Monitoring	
			SW1	SW2	SW1	SW2	SW1	SW2
Water level	cm		< 5		< 5		< 5	
pH	pH units	7.0 – 8.5	NA	NA	NA	7.22	NA	NA
Electrical conductivity (EC)	µS/cm	300-1,500	NA	NA	NA	2,380	NA	NA
Total suspended solids (TSS)	mg/L	NG	NA	NA	NA	46	NA	NA
Alkalinity as CaCO3	mg/L	NG	NA	NA	NA	11	NA	NA
Aluminium	mg/L	0.06	NA	NA	NA	0.21	NA	NA
Arsenic	mg/L	0.013	NA	NA	NA	<0.001	NA	NA
Iron	mg/L	NG	NA	NA	NA	0.43	NA	NA
Ammonia as N	mg/L	0.04	NA	NA	NA	0.02	NA	NA
Nitrite as N	mg/L	0.01	NA	NA	NA	<0.01	NA	NA
Nitrate as N	mg/L		NA	NA	NA	<0.01	NA	NA
Nitrite + nitrate as N	mg/L		NA	NA	NA	<0.01	NA	NA
Total Kjeldahl nitrogen	mg/L	NG	NA	NA	NA	0.9	NA	NA
Total nitrogen as N	mg/L	1.5	NA	NA	NA	0.9	NA	NA
Total phosphorous	mg/L	0.06	NA	NA	NA	0.05	NA	NA

Indicates falls outside of adopted guideline value ranges.

a Default trigger values for wetlands in Southwest Australia as per Table 3.3.6 - 3.3.7 of ANZECC (2000)

b Default guideline values for 95% freshwater ecosystem protection as per ANZG (2018).

NA - Not analysed

NG - No applicable guideline value.

5. STAKEHOLDER ENGAGEMENT

In order to prepare the 2021 Annual Compliance Report, Natural Area and MBS contacted two individuals at Rehoboth, with details outlined in Table 3.

Table 3: Stakeholder Engagement

Date	Name	Purpose	Outcome
Nov 2019	Rachael Fairlamb, Accountant Mark Steyn, CEO	Inform Rehoboth of acceptance of updated management plans by DWER (OEPA).	Information provided
Dec 2019	Rachael Fairlamb, Accountant	Inform Rehoboth of outcomes of discussions relating to the firebreak within the wetland area.	Information provided, to be acted on by Rehoboth
Jan 2020	Rachael Fairlamb, Accountant Mark Steyn, CEO	Evidence to support demonstration of compliance with Ministerial Statement 780 and proponent commitments for the project.	Input into compliance report, with final sign off from CER
May 2020	EPA	Request for temporary cessation of water quality monitoring due to Covid-19.	Approved, Rehoboth advised
Feb and Mar 2021	Rachael Fairlamb, Accountant Mark Steyn, CEO	Evidence to support demonstration of compliance with Ministerial Statement 780 and proponent commitments for the project.	Input into compliance report, with final sign off from CEO

6. AUDIT TABLES

Two audit tables are applicable to the Rehoboth development, namely the Ministerial Statement Audit Table and the Environmental Management Audit Table documenting compliance with Proponent commitments. Rehoboth has completed the Stage 2 phase of the development, with the final phase being the post-development monitoring to ensure the development activities have not impacted on the flora and wetland values within the site boundaries.

6.1 MINISTERIAL STATEMENT AUDIT TABLE

The Ministerial Statement Audit Table was prepared by the then OPEA and outlines auditable Ministerial requirements and commitments that must be adhered to as part of the environmental approvals process. Each item has been assessed and an implementation status determined in accordance with guidance materials prepared by the OEPA (2014), with evidence of the status of each also provided (Table 4).

6.2 ENVIRONMENTAL MANAGEMENT PLAN AUDIT TABLE

With the implementation of Stage 2 development activities, several Proponent commitments have been reactivated until the 3-year post development phase is concluded (Table 5).

Table 4: Ministerial Statement Audit Table

Notes:

- Phases that apply in this table = Pre-Construction, Construction, Operation, Decommissioning, Overall (several phases).
- This audit table is a summary and timetable of conditions and commitments applying to this project. Refer to the Minister's Statement for full detail/precise wording of individual elements.
- Code prefixes: M = Minister's condition; P = Proponent's commitment; A = Audit specification; N = Procedure.
- Abbreviations: CAR = Compliance Assessment Report; CEO = Chief Executive Officer of OEPA; DEC = Department of Environment and Conservation; DER = Department of Environment Regulation; DIA = Department of Indigenous Affairs; DMP = Department of Mining and Petroleum; DoH = Department of Health; DoW = Department of Water, DPaW = Department of Parks and Wildlife, EPA = Environmental Protection Authority, Minister for Env = Minister for the Environment; OEPA = Office of the Environmental Protection Authority.
- Compliance Status: C = Compliant, CLD = Completed, NC = Non – compliant, NR = Not Required at this stage. Please note the terms NA = Not Audited and VR = Verification Required are only for OEPA use. IP = In Process may only be used by the proponent in circumstances outlined in Section 2.8 of the *Post Assessment Guideline for Preparing an Audit Table*.

Audit Code	Subject	Requirement	How	Evidence	Phase	Timeframe	Status
780:M1.1	Proposal Implementation	The proponent shall implement the proposal as assessed by the Environmental Protection Authority and described in schedule 1 of this statement subject to the conditions and procedures of this statement.	Stage 1 completed, Stage 2 completed, in post-development phase	Compliance Reports (CR).	Overall	Phase 1 and 2 construction processes completed May 2019.	CLD
780:M2.1	Proponent Nomination and Contact Details	The proponent for the time being nominated by the Minister for the Environment under sections 38(6) or 38(7) of the Environmental Protection Act 1986 is responsible for the implementation of the proposal.	No change	Website URL: http://www.rehoboth.wa.edu.au/, accessed January 2019.	Overall	Since April 2012.	C
780:M2.2	Proponent Nomination and Contact Details	The proponent shall notify the Chief Executive Officer (CEO) of the Department of Environment and Conservation of any change of the name and address of the proponent for the serving of notices or other correspondence within 30 days of such change.	Not required	Letter to the CEO notifying of change of contact name and address.	Overall	Within 30 days of such change.	C
780:M3.1	Time Limit of Authorisation to commence	The authorisation to implement the proposal provided for in this statement shall lapse and be void within five years after the date of this statement if the proposal to which this statement relates is not substantially commenced.	Ministerial Statement 780 dated 19 Jan 2009	Stage 1 commenced 2011, completed 2015; Stage 2 construction completed May 2019.	Overall	Initial implementation commenced by 19 January 2014.	CLD
780:M3.2	Time Limit of Authorisation to commence	The proponent shall provide the CEO of the Department of Environment and Conservation with written evidence which demonstrates that the proposal has substantially commenced on or before the expiration of five years from the date of this statement.	Completed	Letter to the CEO demonstrating that the proposal has substantially commenced.	Overall	Within one month of commencement.	CLD
780:M4.1	Compliance Reporting	The proponent shall submit to the CEO of the Department of Environment and Conservation environmental compliance reports annually reporting on the previous twelve-month period, unless required by the CEO of the Department of Environment and Conservation to report more frequently.	Compliance reporting, with 2020 compliance report prepared and submitted 05 March 2021.	Compliance report	Overall	Annually by 19 January each year unless required more frequently. Note that 2021 report delayed to a change of personnel at Natural Area and a subsequent change of environmental consulting firm.	NC
780:M4.2	Compliance Reporting	The environmental compliance reports shall address each element of an audit program approved by the CEO of the Department of Environment and Conservation and shall be prepared and submitted in a format acceptable to the CEO of the Department of Environment and Conservation	Audit template provided by OEPA, previously audited annually by Natural Area, with current audit carried out by Natural Area and MBS, with outcomes included in Annual Compliance Report.	Audit program and Compliance Report	Overall	Annually.	C

Audit Code	Subject	Requirement	How	Evidence	Phase	Timeframe	Status
780:M4.3	Compliance Reporting	Submission of Environmental Compliance Reports.	The environmental compliance reports shall: 1. be endorsed by signature of the proponents Managing Director or a person, approved in writing by the CEO of the Department of Environment and Conservation, delegated to sign on behalf of the proponents Managing Director; 2. state whether the proponent has complied with each condition and procedure contained in this statement; 3. provide verifiable evidence of compliance with each condition and procedure contained in this statement; 4. state whether the proponent has complied with each key action contained in any environmental management plan or program required by this statement; 5. provide verifiable evidence of conformance with each key action contained in any environmental management plan or program required by this statement; 6. identify all non-compliances and non-conformances and describe the corrective and preventative actions taken in relation to each non-compliance or non-conformance; 7. review the effectiveness of all corrective and preventative actions taken; and 8. describe the state of implementation of the proposal.	Compliance Report	Overall	Annually	C
780:M4.4	Compliance Reporting	The proponent shall make the environmental compliance reports required by condition 4-1 publicly available in a manner approved by the CEO of the Department of Environment and Conservation	In accordance with Post Assessment Guideline for Making Information Publicly Available (PAG 4) (August 2012)	Available on college website: https://rehoboth.wa.edu.au/public-reports/.	Overall	Within 2 weeks of submission to OEPA.	C
780:M5.1	Performance Review and Reporting	The proponent shall submit to the CEO of the Department of Environment and Conservation Performance Review Reports at the conclusion of the first, third, fifth, seventh and ninth years after the start of implementation of the proposal and then, at such intervals as the CEO of the Department of Environment and Conservation may regard as reasonable.	The Performance Review Reports shall address: 1. the major environmental risks and impacts; the performance objectives, standards and criteria related to these; the success of risk reduction/impact mitigation measures and results of monitoring related to the management of the major risks and impacts; 2. the level of progress in the achievement of sound environmental performance, including industry benchmarking, and the use of best available technology where practicable; and 3. significant improvements gained in environmental management which could be applied to this and other similar projects.	The fifth and final Performance Review Report was submitted 20 January 2020, with the EPA confirming in a letter dated 10 February 2020 that no additional Performance Review Reports will be required.	Overall	At the conclusion of the first, third, fifth, seventh and ninth years after the start of implementation of the proposal and then, at such intervals as the CEO of the DEC may regard as reasonable.	CLD
780:M6.1	Wetland and Vegetation Rehabilitation Plan	Prior to commencement of ground disturbance activities, the proponent shall prepare and submit a Wetland and Vegetation Rehabilitation Plan.	The plan shall meet the objectives set out in Condition 6-3 and the requirements of Condition 6-4 as determined by the CEO of the Department of Environment and Conservation.	Wetland and Vegetation Rehabilitation Plan for Lot 107 completed, letter from OEPA dated 25 October 2016.	Pre-construction	Prior to commencement of ground disturbance activities.	CLD
780:M6.2	Wetland and Vegetation Rehabilitation Plan	In preparing the Plan the proponent shall consult with the DEC and Department of Water (DoW).		Wetland and Vegetation Rehabilitation Plan for Lot 107 completed, letter from OEPA dated 25 October 2016.	Pre-construction	Prior to commencement of ground disturbance activities.	CLD
780:M6.3	Wetland and Vegetation Rehabilitation Plan	Prepare and submit a Wetland and Vegetation Rehabilitation Plan	The objectives of the Plan are to: 1. ensure full rehabilitation of not less than 0.18 hectares of Threatened Ecological Community claypan wetlands (refer to area delineated on Figure 2); 2. ensure partial rehabilitation of not less than 0.66 hectares of Threatened Ecological Community claypan wetlands (refer to area delineated on Figure 2) and; 3. ensure protection of endemic fauna.	Wetland and Vegetation Rehabilitation Plan for Lot 107 completed, letter from OEPA dated 25 October 2016.	Pre-construction	Prior to commencement of ground disturbance activities.	CLD
780:M6.4	Wetland and Vegetation Rehabilitation	Prepare and submit a Wetland and Vegetation Rehabilitation Plan	The Plan shall include management measures for: 1. identification and protection of endemic fauna; 2. removal of weeds; 3. installation of fencing prior to site works; 4. revegetation or rehabilitation with appropriate local species; and 5. implementation of the rehabilitation works by people with demonstrated expertise in rehabilitating wetlands	Wetland and Vegetation Rehabilitation Plan for Lot 107 completed, letter from OEPA dated 25 October 2016.	Pre-construction	Prior to commencement of ground disturbance activities.	CLD
780:M6.5	Wetland and Vegetation Rehabilitation Plan	The proponent shall implement the Wetland Management Plan required by condition 6-1.	Annual Compliance Reports to 2016	Wetland and Vegetation Rehabilitation Plan for Lot 107 completed, letter from OEPA dated 25 October 2016.	Overall	Post construction	CLD

Audit Code	Subject	Requirement	How	Evidence	Phase	Timeframe	Status
780:M7.1	Conservation Covenant	Prior to commencement of ground disturbance activities, the proponent shall enter into a Conservation Covenant with a suitable covenant agency for the Conservation Area delineated in Figure 3 (attached) that will adequately protect the wetland and vegetation values, to the satisfaction of the CEO of the Department of Environment and Conservation.	The covenant shall: 1. ensure conservation of the Declared Rare Flora and Threatened Ecological Communities on site; 2. conserve the Conservation Category Wetland values and valuable linkages to other remnant vegetation and the Greater Brixton Street Wetlands; and 3. prohibit future development of the remaining undeveloped portion of Lot 107.	Conservation Covenant with a suitable covenant agency. Completed, OEPA letter dated 25 October 2016.	Pre-construction	Prior to commencement of ground disturbance activities.	CLD
780:M8.1	Wetland and Vegetation Management Plan	Prior to commencement of ground disturbance activities, the proponent shall prepare and submit a Wetland and Vegetation Management Plan.	The plan shall meet the objectives set out in Condition 8-3 and the requirements of Condition 8-4 as determined by the CEO of the Department of Environment and Conservation.	Wetland and Vegetation Management Plan for Lot 107 approved in 2010, addendum prepared 2018 to include reference to Lot 900, with approval provided by the EPA Services unit on 11 November 2019.	Pre-construction	Prior to commencement of ground disturbance activities.	CLD
780:M8.2	Wetland and Vegetation Management Plan	In preparing the Plan the proponent shall consult with the DEC and DoW.		Wetland and Vegetation Management Plan for Lot 107 approved in 2010, addendum prepared 2018 to include reference to Lot 900, with approval provided by the EPA Services unit on 11 November 2019.	Pre-construction	Prior to commencement of ground disturbance activities.	CLD
780:M8.3	Wetland and Vegetation Management Plan	Prepare and submit a Wetland and Vegetation Management Plan.	The objectives of the Plan are to: 1. ongoing management of the Conservation Area, which includes the Declared Rare Flora, Threatened Ecological Communities and the Conservation Category Wetland (See Figure 3) and; 2. ongoing management of the developed site (post-construction).	Wetland and Vegetation Management Plan for Lot 107 approved in 2010, addendum prepared 2018 to include reference to Lot 900, with approval provided by the EPA Services unit on 11 November 2019.	Pre-construction	Prior to commencement of ground disturbance activities.	CLD
780:M8.4	Wetland and Vegetation Management Plan	Prepare and submit a Wetland and Vegetation Management Plan.	The Plan shall include management measures for: 1. identification and protection of endemic fauna; 2. provision and maintenance of ecological linkages; 3. provision of a densely vegetated strip of no less than 10 metres between the development boundary and the wetland; 4. maintenance of fencing; 5. ongoing weeding; 6. ongoing planting of appropriate local species; 7. maintenance of rehabilitation plantings to ensure successful establishment; 8. ongoing monitoring of wetland and vegetation condition; 9. maintenance of paths and access areas; 10. identification and protection of Aboriginal sites; and 11. fire protection	Wetland and Vegetation Management Plan for Lot 107 approved in 2010, addendum prepared 2018 to include reference to Lot 900, with approval provided by the EPA Services unit on 11 November 2019.	Pre-construction	Prior to commencement of ground disturbance activities.	CLD
780:M8.5	Wetland and Vegetation Management Plan	The proponent shall implement the Wetland Management Plan required by condition 8-1.		Wetland and Vegetation Management Plan for Lot 107 approved in 2010, addendum prepared 2018 to include reference to Lot 900, with approval provided by the EPA Services unit on 11 November 2019.	Overall	Implementation will continue for Phase 2	CLD
780:M9.1	Drainage and Nutrient Management Plan	Prior to commencement of ground disturbance activities, the proponent shall prepare and submit a Drainage and Nutrient Management Plan.	The plan shall meet the objectives set out in Condition 9-3 and the requirements of Condition 9-4 as determined by the CEO of the Department of Environment and Conservation.	Drainage and Nutrient Management Plan for Lot 107 approved in 2010, addendum prepared 2018 to include reference to Lot 900, with approval provided by the EPA Services unit on 11 November 2019.	Pre-construction	Implementation will continue for Phase 2	CLD
780:M9.2	Drainage and Nutrient Management Plan	In preparing the Plan the proponent shall consult with the DEC and DoW.		Drainage and Nutrient Management Plan for Lot 107 approved in 2010, addendum prepared 2018 to include reference to Lot 900, with approval provided by the EPA Services unit on 11 November 2019.	Pre-construction	Implementation will continue for Phase 2	CLD
780:M9.3	Drainage and Nutrient Management Plan	Prepare and submit a Drainage and Nutrient Management Plan.	The objectives of the Plan are to: 1. Protect the environmental values of the wetland, adjacent wetlands and waterways; 2. Ensure that the hydrological regime of the conserved wetland is maintained; 3. Prevent or minimise impacts of nutrients, sediments and other pollutants from stormwater on the water quality of the wetland; and 4. Avoid acid sulphate soil drainage impacts on the wetland.	Drainage and Nutrient Management Plan for Lot 107 approved in 2010, addendum prepared 2018 to include reference to Lot 900, with approval provided by the EPA Services unit on 11 November 2019.	Pre-construction	Implementation will continue for Phase 2	CLD
780:M9.4	Drainage and Nutrient Management Plan	Prepare and submit a Drainage and Nutrient Management Plan.	The Plan shall include management measures for: 1. Acid sulphate soils, including an investigation that details the potential for acid sulphate soils relating to the installation of the perimeter drain and that the subsequent recommendations in the event that ASS be present; 2. Drainage of the site and its potential impacts on the wetland;	Drainage and Nutrient Management Plan for Lot 107 approved in 2010, addendum prepared 2018 to include reference to Lot 900, with approval provided by the EPA Services unit on 11 November 2019.	Pre-construction	Implementation will continue for Phase 2	CLD

Audit Code	Subject	Requirement	How	Evidence	Phase	Timeframe	Status
			3. Stormwater management, including installation of detention basins to minimise impacts of nutrients, sediments and other pollutants on the water quality of the wetland; and 4. Nutrient and irrigation management				
780:M9.5	Drainage and Nutrient Management Plan	The proponent shall implement the Drainage and Nutrient Management Plan required by condition 9-1.		Drainage and Nutrient Management Plan for Lot 107 approved in 2010, addendum prepared 2018 to include reference to Lot 900, with approval provided by the EPA Services unit on 11 November 2019.	Overall	Implementation will continue for Phase 2	CLD

Table 5: Environmental Management Plan Audit Table

Commitments Related to the Development Area

Phase: Prior to construction

No.	Management commitment	How	Evidence	Status	Date
PC1	Prior to site works commencing, the construction area and a 10m buffer will be fenced with temporary 2m high construction fencing prior to site works (in addition to the existing wetland fencing)	During pre-construction works	Limestone retaining wall constructed between development site and conservation area. Audits carried out on 24 October 2018, 27 March 2019 and 17 May 2019 confirmed no impacts to the wetland area.	CLD	19/01/2020
PC2	Prior to site works, sediment fencing will be erected along the northern boundary and the top half of the eastern boundary of the development area to prevent soil and sediment entering the wetland	During pre-construction works	As above	CLD	19/01/2020
PC2	Prior to construction, import clean fill to provide 0.5m clearance above AAMGL for development	During pre-construction works	Clean fill used, with confirmation of dieback free status provided by Glevan Consulting.	CLD	19/01/2020

Phase: During construction

No.	Management commitment	How	Evidence	Status	Date
DC1	During construction, install below ground drainage tanks and associated pipework with sufficient capacity to retain up to the 5 year ARI (as required by the City of Gosnells). Flows in excess of the 5 year ARI are permitted to discharge to the City of Gosnells piped stormwater network located along Brixton Street.	During construction works	Design approved by City of Gosnells during development approvals process; construction completed May 2019	CLD	19/01/2020
DC2	Any wash water resulting from construction activities (i.e., concreting, plastering, painting, gluing) shall be contained within a designated washdown area which will be lined with impervious material and covered to prevent stormwater entering the wash down area. The wash water will be regularly emptied and removed off site by a licensed contractor	Monitored by Site Supervisor and Natural Area	Visits to site by Natural Area since commencement of construction confirmed no requirement for wash water	CLD	19/01/2020
DC3	Waste will be stored in closed skip bins or wheelie bins to minimise wind-blown waste entering the wetland	Site planning and management, monitoring by Site Supervisor and Natural Area	Confirmed by Natural Area during various visits to the site	CLD	19/01/2020
DC4	Site personnel will be made aware of the location of waste bins and any special storage and disposal arrangements (e.g., wash down area)	Induction process and audits by Natural Area and/or Alita Constructions	Initial induction carried out by Natural Area on 27 August, with additional inductions carried out by Alita when required; evidence provided to Natural Area	CLD	19/01/2020
DC5	Where relevant, waste will be removed by a licensed contractor and will be disposed at an approved waste management facility	Waste skips removed weekly, or more frequently as required;	Confirmed by Natural Area during various visits to the site	CLD	19/01/2020
DC6	No hazardous substances or dangerous goods will be stored on site	Site planning and management; little or no requirement for dangerous goods during construction	Confirmed by Natural Area during various visits to the site	CLD	19/01/2020
DC7	Any material contaminated by spills i.e., fuel, oil, lubricants etc. will be stored in a sealed secure container and transported to an approved waste disposal site	Monitored by Site Supervisor and Natural Area	None recorded and no evidence during site visits by Natural Area	CLD	19/01/2020
DC8	Waste storage areas will be located at the southern end of the development area, away from the wetland and the stormwater system	Site planning and management	Confirmed by Natural Area during various visits to the site	CLD	19/01/2020
DC9	Temporary on-site toilets will be removed and replaced regularly	Ongoing construction management	Confirmed by Natural Area during various visits to the site	CLD	19/01/2020
DC10	No vehicles are to be serviced or cleaned onsite to prevent the discharge of pollutants to stormwater	Serviced by offsite providers at appropriate locations, monitored by Site Supervisor and Natural Area	Confirmed by Natural Area during various visits to the site	CLD	19/01/2020
DC11	Encourage construction vehicles to access the site via Kenwick Road and the southern end of Brixton Street, to minimise disturbance to fauna	To be confirmed prior to building commencing	Confirmed by Natural Area during various visits to the site	CLD	19/01/2020
DC12	Construction machinery shall remain on the fill area	Site planning and management	Confirmed by Natural Area during various visits to the site	CLD	19/01/2020
DC13	Flammable waste, including cigarette butts, shall be properly extinguished prior to disposal in waste bins	No smoking allowed on site; checked by Site Supervisor and Natural Area	Confirmed by Natural Area during various visits to the site	CLD	19/01/2020
DC14	Maintain construction fencing throughout construction phase to prevent unlawful access and activities in construction area (i.e., lighting waste bins)	Site planning and management	Confirmed by Natural Area during various visits to the site	CLD	19/01/2020

No.	Management commitment	How	Evidence	Status	Date
DC15	Place temporary demountable buildings for on-site personnel along the Brixton Street edge of the development area to screen construction activities from nearby residents	Site planning and management	Site in locations outside nominated building envelope	CLD	19/01/2020
DC16	Sediment fences will be regularly inspected, particularly during and after heavy rainfall to ensure they are fully functional	Site planning and management	Confirmed by Natural Area during various visits to the site	CLD	19/01/2020
DC17	Undertake a water monitoring program for the site, including groundwater levels and quality and surface water quantity and quality and surface water levels in wetland. This will require the establishment of a staff gauge in the wetland area to measure surface water levels.	Implementation of surface and groundwater monitoring program, as outlined in the Drainage and Nutrient Management Plan and Wetland and Vegetation Management Plan originally prepared by BlueSands Environmental in 2010 and updated by Natural Area 2018	Groundwater quality monitoring continued in 2018 and 2019 during the construction phase of Stage 2, with results provided in previous Annual Compliance Reports. Staff gauge installed 18 September 2013, since damaged and removed. The shallow nature of the wetland means its reinstallation is not warranted.	CLD	19/01/2020
DC18	The boundary of the fill will be regularly inspected by the site manager and periodically by an environmental consultant, particularly during and after heavy rainfall to ensure erosion does not occur	Inspections regularly carried out by Site Supervisor and periodically by Natural Area	Confirmed by Natural Area during various visits to the site	CLD	19/01/2020
DC19	Regularly inspect the washdown area and ensure it is regularly emptied. Environmental consultant to undertake random site inspections to ensure the management commitments are being adhered to and include findings in the performance report	Inspections regularly carried out by Site Supervisor and periodically by Natural Area	Confirmed by Natural Area during various visits to the site	CLD	19/01/2020
DC20	Site manager to regularly inspect the washdown area and ensure it is regularly emptied	Inspections regularly carried out by Site Supervisor and periodically by Natural Area	Confirmed by Natural Area during various visits to the site	CLD	19/01/2020
DC21	Site manager to ensure that the site is regularly cleared of any litter (at least once per week or more often if conditions require)	Inspections regularly carried out by Site Supervisor and periodically by Natural Area	Confirmed by Natural Area during various visits to the site	CLD	19/01/2020
DC22	Site manager to regularly inspect waste storage areas (>3 times/week during construction period) to ensure proper disposal of waste products	Inspections regularly carried out by Site Supervisor and periodically by Natural Area	Confirmed by Natural Area during various visits to the site	CLD	19/01/2020
DC23	Site manager to regularly inspect waste storage areas (>3 times/week during construction period) to ensure bins are regularly emptied and no overflow occurs	Inspections regularly carried out by Site Supervisor and periodically by Natural Area	Confirmed by Natural Area during various visits to the site	CLD	19/01/2020
DC24	Environmental consultant to undertake random site inspections to ensure the management commitments are being adhered to and include findings in the performance report	Random inspections carried out by Natural Area	Confirmed by Natural Area during various visits to the site	CLD	19/01/2020
DC25	Establish a log of any complaints related to construction activities received by Rehoboth Christian School during the construction phase	Electronic complaints register set up in main office, includes details of date, complainant, contact information, details of the complaint, and response	Complaints register in place, with no complaints recorded	CLD	19/01/2020

Phase: Post construction

No.	Management commitment	How	Evidence	Status	Date
PoC1	Provide a densely vegetated strip of local native species along the north western boundary of the development	Mulching and on-ground planting activities	Site visits by Natural Area at various times, plants growing well without being too dense and posing a fire hazard	CLD	12/12/2011
PoC2	Plants and mulch used in landscaping shall be sourced from a NIASA accredited nursery. When ordering plants and mulch the manager/staff from the supplying nursery should be made aware that the plants and mulch must be disease free	Materials sourced from Benara Nursery, which is NIASA accredited, with EcoHort accreditation reflecting best-practice environmental considerations.	Benara website: https://www.benaranurseries.com/about-benara, accessed 02 March 2021	CLD	05/03/2021
PoC3	Only slow release fertilisers will be applied to the oval and any new grassed areas.	2020 results provided	Communication with Rehoboth, Reports from Greenway Turf Solutions provided in Appendix 3.	C	05/03/2021
PoC4	Application will only occur at peak growth times of the year, namely spring or early summer.				
PoC5	Fertiliser application will be subject to soil analysis, to avoid excessive fertiliser application and subsequent leaching into groundwater or runoff into the wetland.				
PoC6	Local native shrubs will be used in landscaping and the densely vegetated strip that shall be planted along the northern boundary of the buildings.	Mulching and on-ground planting activities	Site visit by Natural Area at various times, plants growing well. Landscaping activities carried out during phase 2 works completed using local native species, with tubestock growing well.	CLD	19/01/2020

No.	Management commitment	How	Evidence	Status	Date
PoC7	Annually monitor the survival rate of plants within the vegetated strip for three years post-development	As per monitoring timetable for the conservation area, as determined by the on-ground works contractor, Natural Area	Site visits by Natural Area Consulting at various time confirmed that plants were thriving with no deaths. Monitoring has now occurred for three years post development and is no longer required.	CLD	19/01/2015

Commitments Related to the Conservation Area
Phase: During construction

No.	Monitoring commitment	How	Evidence	Status	Date
DC26	Undertake a water monitoring program for the site, including groundwater levels and quality and surface water quantity and quality and surface water levels in wetland This will require the establishment of a staff gauge in the wetland area to measure surface water levels.	Implementation of surface and groundwater monitoring program, as outlined in the Drainage and Nutrient Management Plan and Wetland and Vegetation Management Plan originally prepared by BlueSands Environmental in 2010 and updated by Natural Area 2018	Groundwater quality monitoring continued in first quarter of 2020 with temporary cessation of sampling granted in May 2020 due to Covid-19 pandemic; certificate of analysis provided in Appendix 2. Staff gauge installed 18 September 2013, since damaged and removed. The shallow nature of the wetland means its reinstallation is not warranted.	C	05/03/2021

Phase: Post construction

No.	Management commitment	How	Evidence	Status	Date
PoC8	Rehabilitate degraded areas of the conservation area, as per the Wetland and Vegetation Rehabilitation Plan (including weed removal, revegetation and maintenance)	On-ground works complete 2013	Natural Area Consulting Management Services Annual Report – January 2015	CLD	19/01/2015
PoC9	Control weeds within the conservation area, paying particular attention to the boundary to ensure no new weed species are introduced to the area	On-ground works complete 2013	Natural Area Consulting Management Services Annual Report – January 2015	CLD	19/01/2015
PoC10	Prevent uncontrolled access of students and other pedestrians entering conservation area by maintaining fencing and keeping access points closed	Retain or install fencing between the main school grounds and the conservation category wetland	Ongoing visits by Natural Area up to November 2020	CLD	19/01/2015
PoC11	Prevent students accessing the area during the months of June to September to prevent any disruption to the breeding season of the Quenda (*Isoodon obesulus fusciventer*)	Retain or install fencing between the main school grounds and the conservation category wetland; No student field and/or project activities to be undertaken during this period	Register of student site visits indicates that visits are not permitted during June – September.	C	05/03/2021
PoC12	Remove any waste dumped in the conservation area as soon as practical, in order to discourage further dumping and to prevent any impacts to flora and fauna	Inspections for the presence of rubbish occur at least each term, any reported rubbish is removed as required	None apparent during various site visits by Natural Area up to November 2020.	C	05/03/2021
PoC13	Manage exotic (introduced) fauna and flora on school grounds and in the conservation area by discouraging pets to be brought into the school grounds and by informing adjacent residents of the need to keep pets out of the conservation area (either by letter drop or a notice in the local paper)	No pets are allowed at the school at any time	Communication with Rehoboth ersonnel; school grounds are fenced preventing uncontrolled access to the wetland area, fence continues to be in good repair.	C	05/03/2021
PoC14	Ensure that exterior building lighting is minimised, particularly on the eastern and northern edges of the new classroom block, to minimise any light disruptions to fauna	Specification during building process, the number of lights in the vicinity of the wetland has been kept to a minimum, as has the illumination level of the lights	Communication with Alita Constructions, included in design requirements, construction complete May 2019	CLD	19/01/2020
PoC15	Annually maintain existing fire breaks and access points	As per City of Gosnells requirements	Bushfire management plan updated 2017, discussions with City of Gosnells, Rehoboth and Natural Area December 2019 to agree alternative firebreak requirements. Works progressing with these works.	C	05/03/2021
PoC16	Liaise with Gosnells Volunteer Fire Brigade to ensure they are familiar with access points to the management area	Rehoboth has developed comprehensive bushfire response procedures, a copy of which has been provided to relevant external organisations, including the fire brigade	Bushfire management plan updated 2017, discussions with City of Gosnells, Rehoboth and Natural Area December 2019 to agree alternative firebreak requirements included access considerations.	C	05/03/2021

No.	Management commitment	How	Evidence	Status	Date
PoC17	Report any suspicious behaviour of people in the conservation area to the relevant authorities	None has occurred at present; policy developed; register set up in main office	Communication with Rehoboth personnel, details included in Rehoboth Critical Incident Policy.	C	05/03/2021
PoC18	Maintain existing fencing to prevent unregulated access to the conservation area	New fencing installed between school and wetland (approx. Jan 2012), existing fencing around wetland will be maintained; fencing will be checked a minimum of once each term, and on an ad hoc basis during class site visits	No evidence of damage to fencing during various site visits by Natural Area up to November 2020.	C	05/03/2021
PoC19	Establish a register for class visits to the wetland area. The register will be included in the annual compliance report, detailing the date of the visit, supervising teacher, number of students and location of visit (i.e., firebreaks, listening posts or transect monitoring)	Register set up and available for inspection at Senior College administration area	Continued communication with Rehoboth Christian School personnel.	C	05/03/2021
PoC20	Undertake a water monitoring program for the site, including groundwater levels and quality and surface water quantity and quality and surface water levels in wetland. This will require the establishment of a staff gauge in the wetland area to measure surface water levels.	Implementation of surface and groundwater monitoring program, as outlined in the Drainage and Nutrient Management Plan and Wetland and Vegetation Management Plan originally prepared by BlueSands Environmental in 2010 and updated by Natural Area 2018	Groundwater quality monitoring continued in 2020 during quarter 1, with approval for the temporary cessation of sampling for the remainder of 2020 due to Covid-19 granted by the EPA; certificate of analysis provided in Appendix 2. Staff gauge installed 18 September 2013, since damaged and removed. The shallow nature of the wetland means its reinstallation is not warranted.	C	05/03/2021
PoC21	Establish three transects in the rehabilitation areas to determine the success of rehabilitation activities (for sampling details, see the Wetland and Vegetation Rehabilitation Plan)	Documented by on-ground works contractor (Natural Area Management and Services)	Natural Area 2015 Annual Report	CLD	19/01/2015
PoC22	Monitor populations of Declared Rare Flora *Lepidosperma rostratum* (for sampling details, see the Wetland and Vegetation Rehabilitation Plan)	Documented by on-ground works contractor	Natural Area 2015 Annual Report	CLD	19/01/2015
PoC23	Conduct a flora survey every five years to measure the cover and composition of native taxa, vegetation condition, priority flora, presence of disease and cover and composition of weeds in the conservation area (for sampling details, see the Wetland and Vegetation Rehabilitation Plan)	To be carried out by appropriately experienced personnel, outcomes compared to the baseline and other monitoring data, and documented	Natural Area 2015 Annual Report	CLD	19/01/2015
PoC24	Monitor indicator bird species that are susceptible to cat predation	Will be documented by on-ground works contractor in annual report, to be carried out in conjunction with senior school students	Natural Area 2016 Performance Review Report	CLD	19/01/2015
PoC25	Monitor endemic fauna, including Quenda and frogs as per the monitoring schedule outlined in the *Wetland and Vegetation Rehabilitation Plan*	Will be documented by on-ground works contractor in annual report, to be carried out in conjunction with senior school students	Natural Area 2016 Performance Review Report	CLD	19/01/2015
PoC26	Publicise the results of the fauna monitoring program undertaken by students in the school newsletter and submit the article to the local newspaper	Results included in NAMS 2013 Annual Works Report	Natural Area 2016 Performance Review Report	CLD	19/01/2015
PoC27	Monitor the occurrence of fire within the conservation area	None to date, fire management plan for the school has been prepared	Aerial imagery available from NearMap and/or Landgate, communication with Rehoboth personnel.	C	05/03/2021
PoC28	Periodically inspect perimeter fencing every 2 to 3 months to ensure it is in good condition	Regular inspections of perimeter fencing for general condition will occur once per term as a minimum	New fence installed approx. Jan 2012, continues to be in good repair.	C	05/03/2021

7. GLOSSARY

Abbreviation	Definition
ANZECC	Australian and New Zealand Environment and Conservation Council
ARI	Assessment on Referral Information; assessment level under Part IV of the *Environmental Protection Act 1986* (WA) set by the Environmental Protection Authority (EPA) whereby the assessment is carried out on the basis of information submitted by the proponent
ARMCANZ	Agriculture and Resource Management Council of Australia and New Zealand
CCW	Conservation category wetland as defined by the wetlands branch of the Department of Parks and Wildlife (DPaW) and listed on the Geomorphic Wetlands Swan Coastal Plain Dataset
DBCA	Department of Biodiversity, Conservation and Attractions
DEC	Department of Environment and Conservation; then DER and DPaW, now DWER and DBCA
DER	Department of Environment Regulation, now DWER
DPaW	Department of Parks and Wildlife, now DBCA
DWER	Department of Water and Environmental Regulation
EMP	Environmental Management Plan, prepared as an environmental approval condition
EPA	Environmental Protection Authority (Western Australia)
OEPA	Office of the Environmental Protection Authority
TEC	Threatened ecological community declared or listed under the *Biodiversity Conservation Act 2016* (WA) (and/or the *Environmental Protection and Biodiversity Conservation Act 1999* (Cwlth))

8. REFERENCES

Australian and New Zealand Environment Conservation Council (ANZECC) and Agriculture and Resource Management Council of Australia and New Zealand (ARMCANZ), (2000), *Australian and New Zealand Guidelines for Fresh and Marine Water Quality*, https://www.waterquality.gov.au/guidelines/anz-fresh-marine, accessed March 2021.

ANZG. 2018. *Australian and New Zealand Guidelines for Fresh and Marine Water Quality*. Australian and New Zealand Governments and Australian State and Territory Governments. www.waterquality.gov.au/anz-guidelines (accessed March 2021).

Environmental Protection Act 1986 (WA)
http://www.epa.wa.gov.au/sites/default/files/EPA_Report/2460_Bull_1249_Rehoboth.pdf, accessed March 2021.

Environmental Protection Authority, (EPA) 2007, *Bulletin 1249, Report and Recommendations: Extension of Rehoboth Christian School, 92 Kenwick Road, Kenwick*,

Fairlamb, R., (2020 and 2021), Accountant, Rehoboth Christian College, Personal Communication.

Natural Area Consulting Management Services, (2019), *Flora Monitoring and Weed Mapping Report – Rehoboth Conservation Area*, unpublished report prepared for Rehoboth Christian College.

Natural Area Consulting Management Services, (2020), *Rehoboth Christian College – Kenwick Annual Compliance Report – Ministerial Statement 780*, unpublished report prepared for Rehoboth Christian College.

Office of Environmental Protection Authority, (2009), *Statement that a Proposal May be Implemented (Pursuant to the Provisions of the Environmental Protection Act 1986) – Extension of Rehoboth Christian School 92 Kenwick Road, Kenwick, City of Gosnells*, available http://www.epa.wa.gov.au/sites/default/files/1MINSTAT/00780.pdf, accessed March 2021.

Office of Environmental Protection Authority, (2009), *Statement that a Proposal May be Implemented (Pursuant to the Provisions of the Environmental Protection Act 1986) – Extension of Rehoboth Christian School 92 Kenwick Road, Kenwick, City of Gosnells*, http://www.epa.wa.gov.au/sites/default/files/Ministerial_Statement/00780.pdf, accessed March 2021.

Steyn, M., (2020), Chief Executive Officer, Association for Christian Education Inc. (Rehoboth Christian College), Personal Communication.

APPENDICES

APPENDIX 1: STATEMENT OF COMPLIANCE

1. Proposal and Proponent Details

Proposal Title		Extension of Rehoboth Christian School 92 Kenwick Road, Kenwick, City of Gosnells
Statement Number		780
Proponent Name		Association for Christian Education Inc.
Proponent's Australian Company Number *(where relevant)*		N/A

2. Statement of Compliance Details

Reporting Period	*20/01/20* to *19/01/21*

Implementation phase(s) during reporting period (please tick ✓ relevant phase(s))							
Pre-construction		Construction		Operation	✓	Decommissioning	

Audit Table for Statement addressed in this Statement of Compliance is provided at Attachment:	Included in ACR
An audit table for the Statement addressed in this Statement of Compliance must be provided as Attachment 2 to this Statement of Compliance. The audit table must be prepared and maintained in accordance with the Department of Water and Environmental Regulation (DWER) *Post Assessment Guideline for Preparing an Audit Table*, as amended from time to time. The 'Status Column' of the audit table must accurately describe the compliance status of each implementation condition and/or procedure for the reporting period of this Statement of Compliance. The terms that may be used by the proponent in the 'Status Column' of the audit table are limited to the Compliance Status Terms listed and defined in Table 1 of Attachment 1.	

Were all implementation conditions and/or procedures of the Statement complied with within the reporting period? (please tick ✓ the appropriate box)			
No (please proceed to Section 3)	✓	Yes (please proceed to Section 4)	

Each page (including Attachment 2) must be initialled by the person who signs Section 4 of this Statement of Compliance.

INITIALS: 

3. Details of Non-compliance(s) and/or Potential Non-compliance(s)

The information required in Section 3 must be provided for each non-compliance or potential non-compliance identified during the reporting period covered by this Statement of Compliance.

Non-compliance/potential non-compliance 0-1

Which implementation condition or procedure was non-compliant or potentially non-compliant?
780:M4.1
Was the implementation condition or procedure non-compliant or potentially non-compliant?
Yes
On what date(s) did the non-compliance or potential non-compliance occur (if applicable)?
A change of personnel at Natural Area in November 2020 meant the organisation did not complete and submit the Annual Compliance Report by 19 January 2021. When this was realised by Rehoboth, the original consultant who had regularly undertaken these works for Rehoboth was engaged through the consultancy they now work for (MBS) to complete this work.
Was this non-compliance or potential non-compliance reported to the Chief Executive Officer, DWER?
☑ Yes ☑ Reported to DWER verbally Date 22 Feb 2021_____ ☑ Reported to DWER in writing Date 22 Feb 2021_____ ☐ No
What are the details of the non-compliance or potential non-compliance and where relevant, the extent of and impacts associated with the non-compliance or potential non-compliance?
The 2021 Annual Compliance Report was not completed and submitted to the EPA by the 5 March 2021 no environmental impacts have resulted from this delay.
What is the precise location where the non-compliance or potential non-compliance occurred (if applicable)? (please provide this information as a map or GIS co-ordinates)
N/A – non-compliance relates to failure to complete and submit Annual Compliance Report by due date.
What was the cause(s) of the non-compliance or potential non-compliance?
The consultant who usually undertook this work on our behalf whilst working at Natural Area left the organisation in November 2020, and it was not undertaken by others in their absence.
What remedial and/or corrective action(s), if any, were taken or are proposed to be taken in response to the non-compliance or potential non-compliance?
When it was realised the report had not been prepared and submitted, the original consultant who did that work for us was contracted through the consultancy they now work for to do this work and look after environmental matters for Rehoboth until the conclusion of the Stage 2 post-development phase is complete.
What measures, if any, were in place to prevent the non-compliance or potential non-compliance before it occurred? What, if any, amendments have been made to those measures to prevent re-occurrence?
A hand-over of projects prior to the consultant leaving Natural Area was carried out within the organisation. N/A, Rehoboth has engaged the original consultant through their new place of employment, MBS, to ensure this does not recur.

Each page (including Attachment 2) must be initialled by the person who signs Section 4 of this Statement of Compliance.

INITIALS: 

Please provide information/documentation collected and recorded in relation to this implementation condition or procedure:
- in the reporting period addressed in this Statement of Compliance; and
- as outlined in the approved Compliance Assessment Plan for the Statement addressed in this Statement of Compliance.

(the above information may be provided as an attachment to this Statement of Compliance)

For additional non-compliance or potential non-compliance, please duplicate this page as required.

Each page (including Attachment 2) must be initialled by the person who signs Section 4 of this Statement of Compliance.

INITIALS:

4. Proponent Declaration

I, MARK CHRISTOPHER STEYN ..... *(full name and position title)*

declare that I am authorised on behalf of the Association for Christian Education Inc. .....

(being the person responsible for the proposal) to submit this form and that the information contained in this form is true and not misleading.

Signature:..... Date: 05.02.2021

Please note that:
it is an offence under section 112 of the *Environmental Protection Act 1986* for a person to give or cause to be given information that to his knowledge is false or misleading in a material particular; and
the Chief Executive Officer of the DWER has powers under section 47(2) of the *Environmental Protection Act 1986* to require reports and information about implementation of the proposal to which the statement relates and compliance with the implementation conditions.

5. Submission of Statement of Compliance

One hard copy and one electronic copy (preferably PDF on CD or thumb drive) of the Statement of Compliance are required to be submitted to the Chief Executive Officer, DWER, marked to the attention of Manager, Compliance (Ministerial Statements).

Please note, the DWER has adopted a procedure of providing written acknowledgment of receipt of all Statements of Compliance submitted by the proponent, however, the DWER does not approve Statements of Compliance.

6. Contact Information

Queries regarding Statements of Compliance, or other issues of compliance relevant to a Statement may be directed to Compliance (Ministerial Statements), DWER:

Manager, Compliance (Ministerial Statements)

Department of Water and Environmental Regulation

Postal Address:	Locked Bag 10 EAST PERTH WA 6892
Phone:	(08) 6364 700
Email:	compliance@dwer.wa.gov.au

7. Post Assessment Guidelines and Forms

Post assessment documents can be found at www.epa.wa.gov.au

Each page (including Attachment 2) must be initialled by the person who signs Section 4 of this Statement of Compliance.

INITIALS:

ATTACHMENT 1

Table Appendix 1: Compliance Status Term

Compliance Status Terms	Abbrev	Definition	Notes
Compliant	C	Implementation of the proposal has been carried out in accordance with the requirements of the audit element.	This term applies to audit elements with: ongoing requirements that have been met during the reporting period; and requirements with a finite period of application that have been met during the reporting period, but whose status has not yet been classified as 'completed'.
Completed	CLD	A requirement with a finite period of application has been satisfactorily completed.	This term may only be used where: audit elements have a finite period of application (e.g. construction activities, development of a document); the action has been satisfactorily completed; and the DWER has provided written acceptance of 'completed' status for the audit element.
Not required at this stage	NR	The requirements of the audit element were not triggered during the reporting period.	This should be consistent with the 'Phase' column of the audit table.
Potentially Non-compliant	PNC	Possible or likely failure to meet the requirements of the audit element.	This term may apply where during the reporting period the proponent has identified a potential non-compliance and has not yet finalized its investigations to determine whether non-compliance has occurred.
Non-compliant	NC	Implementation of the proposal has not been carried out in accordance with the requirements of the audit element.	This term applies where the requirements of the audit element are not "complete" have not been met during the reporting period.
In Process	IP	Where an audit element requires a management or monitoring plan be submitted to the DWER or another government agency for approval, that submission has been made and no further information or changes have been requested by the DWER or the other government agency and assessment by the DWER or other government agency for approval is still pending.	The term 'In Process' may not be used for any purpose other than that stated in the Definition Column. The term 'In Process' may not be used to describe the compliance status of an implementation condition and/or procedure that requires implementation throughout the life of the project (e.g., implementation of a management plan).

Each page (including Attachment 2) must be initialled by the person who signs Section 4 of this Statement of Compliance.

INITIALS: 

APPENDIX 2: ALS CERTIFICATE OF ANALYSIS

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **EP2002807**	Page	: 1 of 3
Client	: **NATURAL AREA CONSULTING**	Laboratory	: Environmental Division Perth
Contact	: SUE BRAND	Contact	: Customer Services EP
Address	: 99C LORD STREET WHITEMAN WESTERN AUSTRALIA 6068	Address	: 26 Rigali Way Wangara WA Australia 6065
Telephone	: 08 9209 2767	Telephone	: +61-8-9406 1301
Project	: Rehoboth Christian College	Date Samples Received	: 17-Mar-2020 12:20
Order number	: ----	Date Analysis Commenced	: 17-Mar-2020
C-O-C number	: ----	Issue Date	: 25-Mar-2020 21:49
Sampler	: Sharon Hynes		
Site	: Rehoboth Christian College 92 Kenwick Road, Kenwick		
Quote number	: EP/889/19		
No. of samples received	: 2		
No. of samples analysed	: 2		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Canhuang Ke	Inorganics Supervisor	Perth Inorganics, Wangara, WA
Chris Lemaitre	Laboratory Manager (Perth)	Perth Inorganics, Wangara, WA

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

Analytical Results

Sub-Matrix: GROUNDWATER (Matrix: WATER)				Client sample ID	MB1	MB2	----	----	----
				Client sampling date / time	17-Mar-2020 08:15	17-Mar-2020 08:45	----	----	----
Compound	CAS Number	LOR	Unit		EP2002807-001	EP2002807-002	--------	--------	--------
					Result	Result	----	----	----
EA005P: pH by PC Titrator									
pH Value	----	0.01	pH Unit		**7.51**	**7.18**	----	----	----
EA010P: Conductivity by PC Titrator									
Electrical Conductivity @ 25°C	----	1	µS/cm		**6810**	**5450**	----	----	----
EA025: Total Suspended Solids dried at 104 ± 2°C									
Suspended Solids (SS)	----	5	mg/L		**104**	**560**	----	----	----
ED038A: Acidity									
Acidity as CaCO3	----	1	mg/L		**22**	**22**	----	----	----
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L		<0.01	<0.01	----	----	----
Arsenic	7440-38-2	0.001	mg/L		<0.001	<0.001	----	----	----
Iron	7439-89-6	0.05	mg/L		**0.19**	<0.05	----	----	----
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L		**0.03**	**0.17**	----	----	----
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L		**0.02**	<0.01	----	----	----
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L		**0.09**	**0.16**	----	----	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L		**0.11**	**0.16**	----	----	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L		**0.8**	**0.7**	----	----	----
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L		**0.9**	**0.9**	----	----	----
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L		**0.03**	**0.07**	----	----	----

APPENDIX 3 NUTRIENT CERTIFICATES OF ANALYSIS

SOIL ANALYSIS REPORTS

FROM

GREENWAY TURF SOLUTIONS

REHOBOTH CHRISTIAN COLLEGE

MAIN OVAL, PRIMARY LAWN, GYM AREA

KENWICK

Prepared By Stephen Jones

Territory Manager – GTS

9-4-2020

Soil Analysis

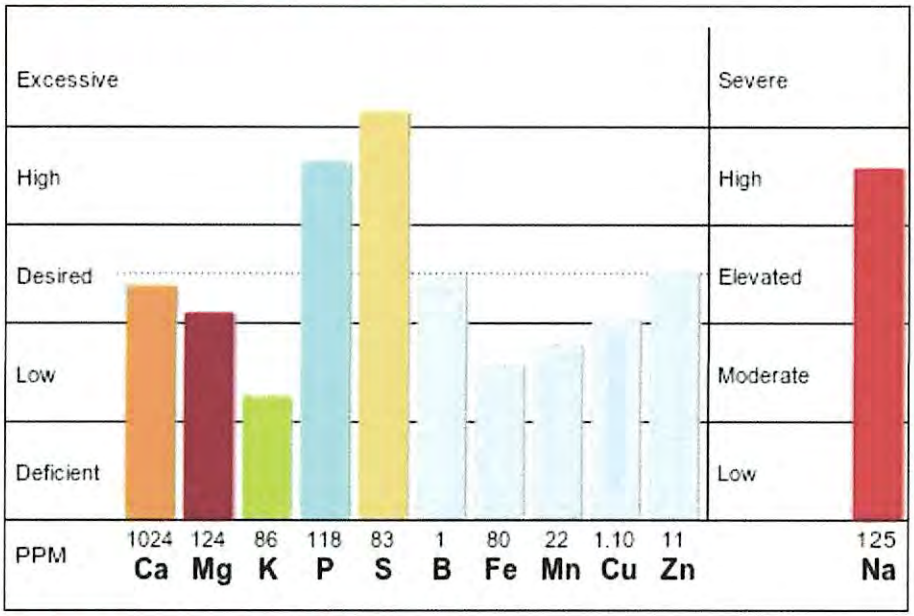
Conducted by The Ninemire Group LLC

Client: Rehoboth Christian College

Field Representative: Steve Jones

Date of Analysis: April 7, 2020

SOIL NUTRIENT STATUS: MAIN OVAL

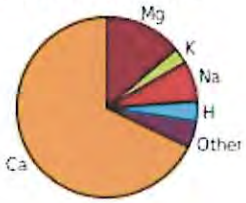


Organic Matter (humus)	3.5%
pH (H_2O 1:5)	6.8
Conductivity (mmhos/cm)	0.19
Total Exchange Capacity	7.5

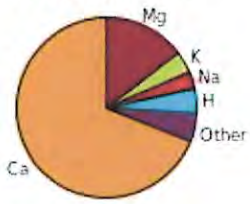
BASE SATURATION: KEY ELEMENTS

	Actuals
Ca	**67.88%**
Mg	**13.73%**
K	**2.93%**
Na	**7.22%**
H	**3.6%**
Other	**4.64%**

Actual Saturation



Ideal Saturation



Ideals	
68-72%	**Ca**
13-16%	**Mg**
3-5%	**K**
<3%	**Na**
4.50%	**H**
5%	**Other**

COMMENTS

These numbers are to correct soil deficiencies only. Nutrient losses such as leaching or plant uptake should be considered when formulating maintenance programs.

Kg per Ha of Calcium deficient	20	Apply a total of **0.5** Kg per 100 m² of a 38% Ca material over an appropriate number of applications.
Kg per Ha of Magnesium deficient	12	Apply a total of **0.7** Kg per 100 m² of a 17% Mg material over an appropriate number of applications.
Kg per Ha of Potassium deficient	47	Apply a total of **1.1** Kg per 100 m² of a 0-0-42 material over an appropriate number of applications.
Kg per Ha of Phosphorus deficient	0	

7 April 2020

Soil Nutrient Analysis Report

Customer	REHOBOTH CHRISTIAN COLLEGE	Report Name	MAIN OVAL
Dominant Species	Couch Grass	Surface Type	Oval
Reporting Date	9/04/2020	Territory Manager	STEPHEN JONES

The Soil Nutrient Analysis has been completed, the results and recommendations based on averages of all samples are as follows;

1. Physical and Chemical Properties

Organic Matter (Humus)

The level of soil organic matter was adequate within the samples. This indicates that the profile should be able to retain nutrients and moisture for the plants use. To maintain a good level of organic matter continue to apply organic based fertilisers and amendments regularly throughout the year.

Sample Result: 3.5 % **Interpretation:** Desirable

Soil pH

The average pH level in the samples was adequate. This is a slightly acidic to neutral pH, at this level all nutrients will be available to the plant.

Sample Result: 6.8 pH **Interpretation:** Desirable

Electrical Conductivity (EC)

The average EC reading was at an adequate level within the samples. No action is required.

Sample Result: 0.19 dS/m **Interpretation:** Desirable

Total Exchange Capacity (TEC)

The TEC level was adequate in the samples. This indicates that nutrients are available to the plant in the root zone. To maintain the TEC at this level continue to use humus based products regularly throughout the year.

Sample Result: 7.5 meq/100mL **Interpretation:** Desirable

2. Nutrients

Calcium (Ca)

On average calcium (Ca) levels in the samples were low. The lack of calcium in the profile could be reducing soil structure and may cause compaction and low porosity. A lack of calcium can also allow a build up of undesirable cations such as sodium. Calcium is a vital nutrient in plant cell strength and development, and low levels can cause the plant to become more susceptible to disease. The cause to a low calcium soil profile could be poor quality irrigation water containing bicarbonates.

Sample Result: 67.88 % **Interpretation:** Low

Magnesium (Mg)

The average magnesium (Mg) levels in the samples were in the desired range. As magnesium is vital for photosynthesis and other functions in the turf plant, it is important to maintain the magnesium level within this desirable range.

Sample Result: 13.73 % **Interpretation:** Desirable

Potassium (K)

On average potassium (K) levels were low within the samples. It is important to keep potassium at optimum levels within the profile as it is generally required in large amounts by the plant (second to nitrogen). Potassium is the main nutrient required for stress tolerance, by hardening cell walls it increases resistance to disease and pest attack. Potassium is easily leached from the profile so it is important to maintain yearly applications

Sample Result: 2.93 % **Interpretation:** Low

Phosphorus (P)

On average phosphorus (P) levels were within the desired range in the samples. Phosphorus is used by the plant in the transfer and storage of energy. It is also required to make vital acids and compounds used for plant growth and root development.

Sample Result: 118 ppm **Interpretation:** Desirable

Sodium (Na)

The average sodium (Na) levels were high within the samples. Sodium is destructive to turf soils, causing poor soil structure, limiting drainage and reducing oxygen levels in the root zone. High sodium is often indicative of poor quality irrigation water. Good calcium and magnesium levels help to reduce sodium in the profile by displacing it on cation exchange sites.

Sample Result: 7.22 % **Interpretation:** High

Hydrogen (H)

The proportion of hydrogen (h) in the base saturation percentage is desirable. The level of hydrogen is driven by soil pH, with a lower pH resulting in a higher proportion of hydrogen in relation to other cations. While hydrogen does not necessarily impact on the plant directly, it does occupy valuable exchange sites, reducing the presence of beneficials such as Ca, Mg and K.

Sample Result: 3.6 % **Interpretation:** Desirable

3. Micronutrients

Iron (Fe)

Average iron (Fe) levels within the samples were low. Iron is the key nutrient required for the production of chlorophyll. Low iron could be reducing the plants ability to photosynthesise and exhibiting symptoms of chlorosis (yellowing of foliage). Often iron is high within the soil, but is largely unavailable to the plant due to excessive P levels or high soil pH.

Sample Result:	80 ppm	**Interpretation:**	Low

Boron (B)

Average boron (B) levels within the samples were within the desirable range. Boron is important for plant growth as it is required for cell wall formation within plants. Without Boron, root cell elongation and activity is unable to occur or is limited, affecting plant growth and development.

Sample Result:	1 ppm	**Interpretation:**	Desirable

Sulphur (S)

Average sulphur (S) levels within the samples were high. Sulphur is an important nutrient for the amino acids and chlorophyll. Low sulphur levels could be limiting the plants ability to photosynthesise, resulting in a general lack of growth vigour. Due to the acidifying affect of sulphur high levels could lead to a low pH, reducing the availability of some nutrients.

Sample Result:	83 ppm	**Interpretation:**	High

Manganese (Mn)

Average manganese (Mn) levels within the samples were low. Like iron, manganese is used by the plant to produce chlorophyll. Low levels can result in a general lack in vigour due to the plants inability to effectively generate energy.

Sample Result:	22 ppm	**Interpretation:**	Low

Copper (Cu)

Average copper (Cu) levels within the samples were in the desirable range. Like zinc, copper is required by the plant in small quantities to form certain hormones and enzymes. Low copper levels can result in a lack of new growth and the dying off of new tillers.

Sample Result:	1.1 ppm	**Interpretation:**	Desirable

Zinc (Zn)

Zinc (Zn) levels within the samples were in the desired range. Zinc is required by turf grass in small quantities for the development of certain growth hormones.

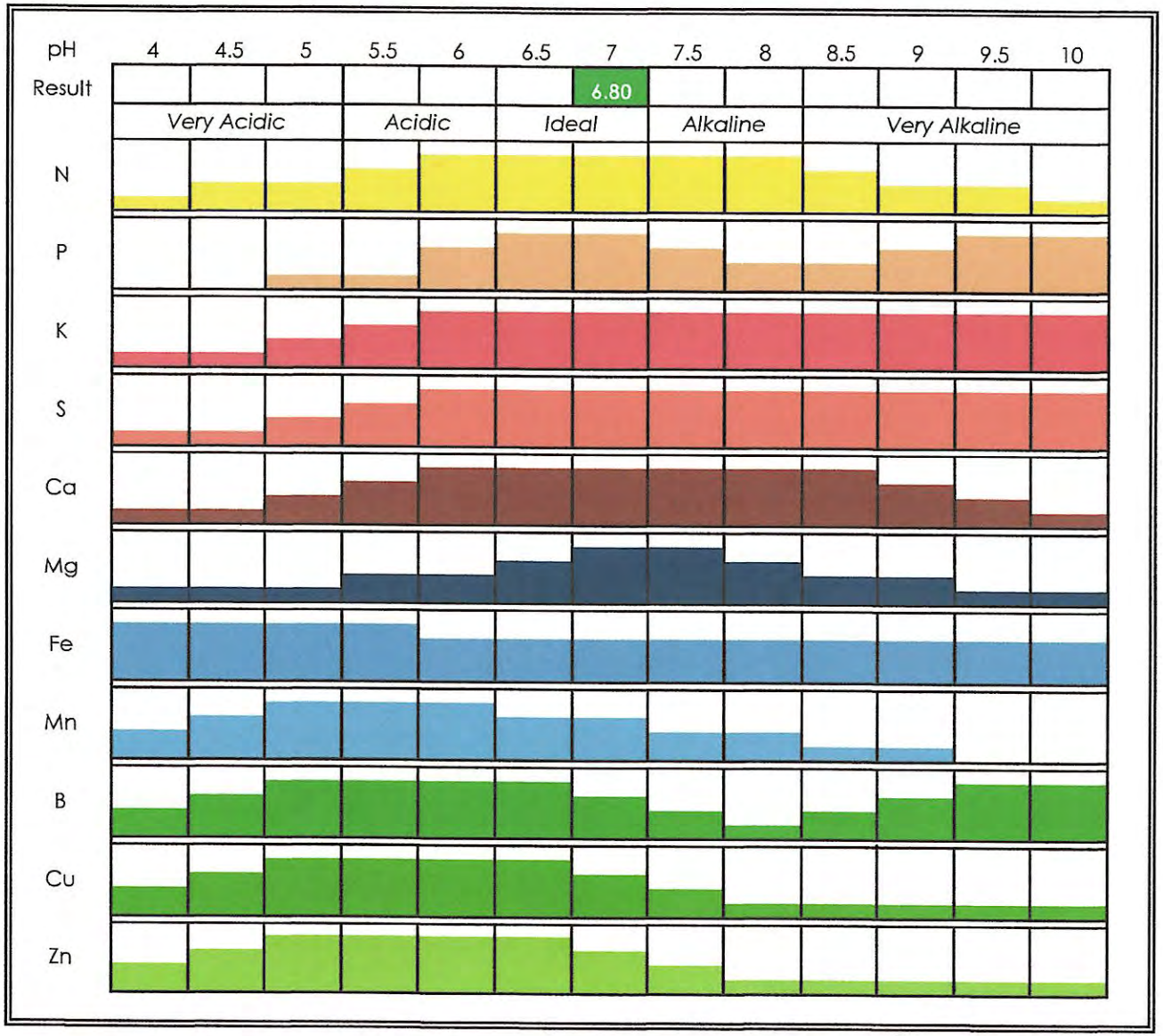
Sample Result:	11 ppm	**Interpretation:**	Desirable

4. Nutrient Availability as Influenced by Soil pH

Sample ID:	MAIN OVAL

Date:	9-Apr-20

Sample Result (H_20 1:5): 6.80



This chart indicates the availability of different nutrients to the plant, dependent on the soil pH level. pH governs the solubility and hence the availability of nutrients in solution. Ideal soil pH for turfgrass is between 6.5 - 7.5.

Soil Analysis

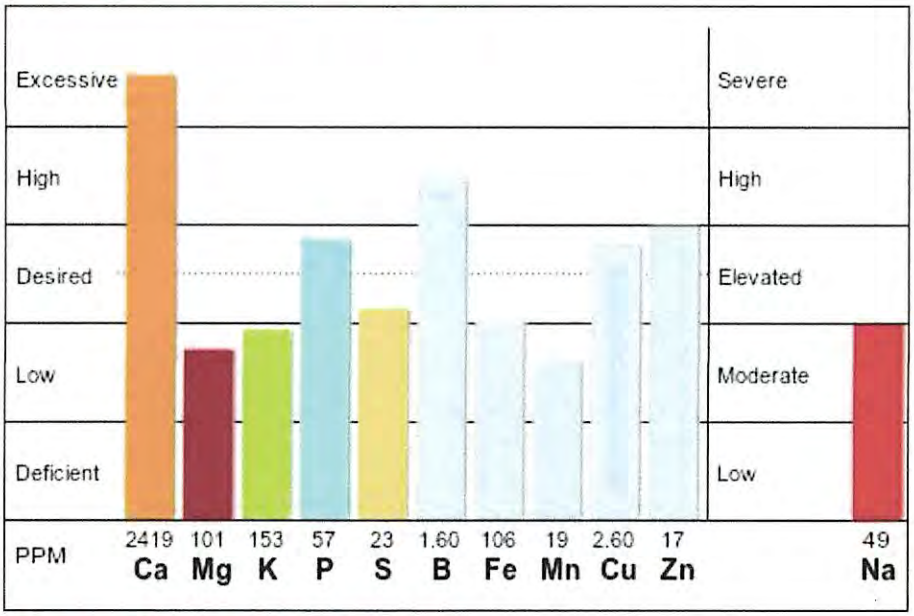
Conducted by The Ninemire Group LLC

Client: Rehoboth Christian College

Field Representative: Steve Jones

Date of Analysis: April 7, 2020

SOIL NUTRIENT STATUS: GYM LAWN



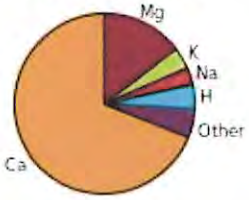
Organic Matter (humus)	2.8%
pH (H_2O 1:5)	8
Conductivity (mmhos/cm)	0.11
Total Exchange Capacity	14.2

BASE SATURATION: KEY ELEMENTS

	Actuals
Ca	**85.39%**
Mg	**5.96%**
K	**2.76%**
Na	**1.49%**
H	**0.0%**
Other	**4.4%**

Actual Saturation

Ideal Saturation



Ideals	
68-72%	**Ca**
13-16%	**Mg**
3-5%	**K**
<3%	**Na**
4.50%	**H**
5%	**Other**

COMMENTS

These numbers are to correct soil deficiencies only. Nutrient losses such as leaching or plant uptake should be considered when formulating maintenance programs.

Kg per Ha of Calcium deficient	0	
Kg per Ha of Magnesium deficient	223	Apply a total of **13.1** Kg per 100 m² of a 17% Mg material over an appropriate number of applications.
Kg per Ha of Potassium deficient	103	Apply a total of **2.5** Kg per 100 m² of a 0-0-42 material over an appropriate number of applications.
Kg per Ha of Phosphorus deficient	0	

Western Australia adam@greenwaytechnologies.com

7 April 2020

Soil Nutrient Analysis Report

Customer	REHOBOTH CHRISTIAN COLLEGE	Report Name	GYM AREA
Dominant Species	Kikuyu	Surface Type	Lawn
Reporting Date	9/04/2020	Territory Manager	STEPHEN JONES

The Soil Nutrient Analysis has been completed, the results and recommendations based on averages of all samples are as follows;

1. Physical and Chemical Properties

Organic Matter (Humus)

The level of soil organic matter was relatively low in the samples. This could be resulting in nutrient leaching, and reducing the water holding capacity of the soil. To bring the organic matter content to an adequate level the use of organic based fertilisers and amendments is recommended.

Sample Result: 2.8 % **Interpretation:** Low

Soil pH

The average pH level in the samples was extremely high. This is an alkaline pH, at this level soil structure will be directly affected and many nutrients such as Fe, Mn, B, Cu, Zn and P will be unavailable to the plant. To lower pH to the optimum level applications of sulphur based products should be used.

Sample Result: 8 pH **Interpretation:** Very High

Electrical Conductivity (EC)

The average EC reading was at an adequate level within the samples. No action is required.

Sample Result: 0.11 dS/m **Interpretation:** Desirable

Total Exchange Capacity (TEC)

The TEC was high within the samples. This indicates a high presence of organic matter or clay particles and could result in compaction.

Sample Result: 14.2 meq/100mL **Interpretation:** High

2. Nutrients

Calcium (Ca)

On average calcium (Ca) levels in the samples were high. Calcium is a dominant cation and high levels can prevent other nutrients such as magnesium from occupying exchange sites in the profile. It is important to maintain a balanced Ca - Mg ratio of about 75 : 15 to ensure optimum soil structure and plant health.

Sample Result:	85.39 %	**Interpretation:**	High

Magnesium (Mg)

The average magnesium (Mg) levels were very low within the samples. Magnesium is a cation that is vital for the plant to photosynthesise, and is (along with calcium) an important component of a good soil structure. It is likely that the turf plant is suffering from the lack of magnesium. Low magnesium can allow for the build up of undesirable cations such as sodium.

Sample Result:	5.96 %	**Interpretation:**	Very Low

Potassium (K)

On average potassium (K) levels were low within the samples. It is important to keep potassium at optimum levels within the profile as it is generally required in large amounts by the plant (second to nitrogen). Potassium is the main nutrient required for stress tolerance, by hardening cell walls it increases resistance to disease and pest attack. Potassium is easily leached from the profile so it is important to maintain yearly applications

Sample Result:	2.76 %	**Interpretation:**	Low

Phosphorus (P)

On average phosphorus (P) levels were low in the samples. Phosphorus is used by the plant in the transfer and storage of energy. It is also required to make vital acids and compounds used for plant growth and root development.

Sample Result:	57 ppm	**Interpretation:**	Low

Sodium (Na)

The average sodium (Na) levels were adequate within the samples. Sodium is destructive to turf soils, causing poor soil structure, limiting drainage and reducing oxygen levels in the root zone. Good calcium and magnesium levels help to reduce sodium in the profile by displacing it on cation exchange sites.

Sample Result:	1.49 %	**Interpretation:**	Desirable

Hydrogen (H)

The proportion of hydrogen (h) in the base saturation percentage is desirable. The level of hydrogen is driven by soil pH, with a lower pH resulting in a higher proportion of hydrogen in relation to other cations. While hydrogen does not necessarily impact on the plant directly, it does occupy valuable exchange sites, reducing the presence of beneficials such as Ca, Mg and K.

Sample Result:	0 %	**Interpretation:**	Desirable

3. Micronutrients

Iron (Fe)

Average iron (Fe) levels within the samples were within the desired range. Iron is the key nutrient required for the production of chlorophyll. Low iron could be reducing the plants ability to photosynthesise and exhibiting symptoms of chlorosis (yellowing of foliage). Often iron is high within the soil, but is largely unavailable to the plant due to excessive P levels or high soil pH.

Sample Result:	106 ppm	**Interpretation:**	Desirable

Boron (B)

Average boron (B) levels within the samples were within the desirable range. Boron is important for plant growth as it is required for cell wall formation within plants. Without Boron, root cell elongation and activity is unable to occur or is limited, affecting plant growth and development.

Sample Result:	1.6 ppm	**Interpretation:**	Desirable

Sulphur (S)

Average sulphur (S) levels within the samples were at the desirable level. Sulphur is an important nutrient for the amino acids and chlorophyll. Low sulphur levels could be limiting the plants ability to photosynthesise, resulting in a general lack of growth vigour.

Sample Result:	23 ppm	**Interpretation:**	Desirable

Manganese (Mn)

Average manganese (Mn) levels within the samples were low. Like iron, manganese is used by the plant to produce chlorophyll. Low levels can result in a general lack in vigour due to the plants inability to effectively generate energy.

Sample Result:	19 ppm	**Interpretation:**	Low

Copper (Cu)

Average copper (Cu) levels within the samples were high. Like zinc, copper is required by the plant in small quantities to form certain hormones and enzymes. In high quantities copper can be toxic to turf grass.

Sample Result:	2.6 ppm	**Interpretation:**	High

Zinc (Zn)

Zinc (Zn) levels within the samples were high. Zinc is required by turf grass in small quantities for the development of certain growth hormones. A build up of zinc in the profile can become toxic to the plant.

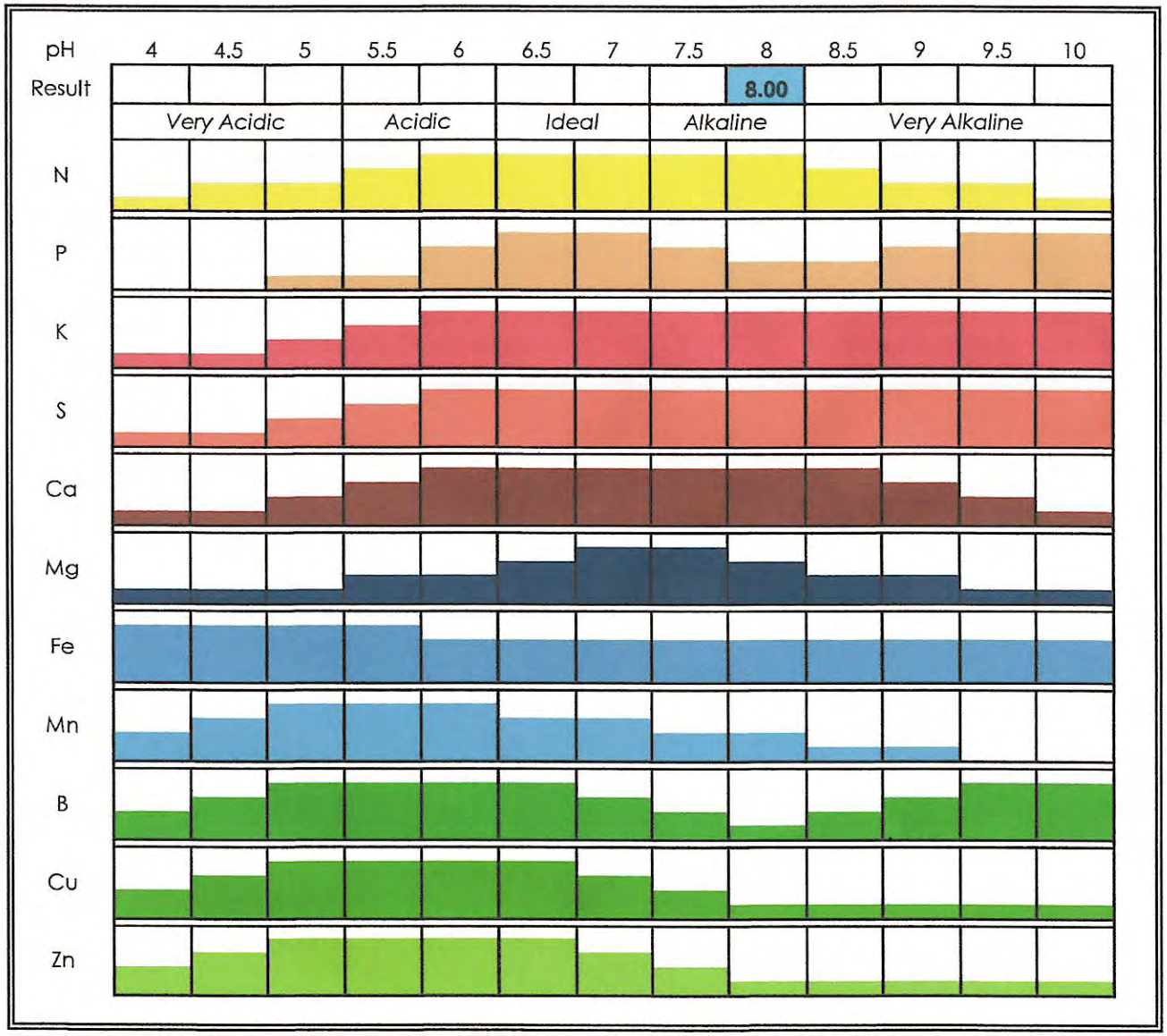
Sample Result:	17 ppm	**Interpretation:**	High

4. Nutrient Availability as Influenced by Soil pH

Sample ID:	GYM AREA

Date:	9-Apr-20

Sample Result (H_2O 1:5): 8.00



This chart indicates the availability of different nutrients to the plant, dependent on the soil pH level. pH governs the solubility and hence the availability of nutrients in solution. Ideal soil pH for turfgrass is between 6.5 - 7.5.

Soil Analysis

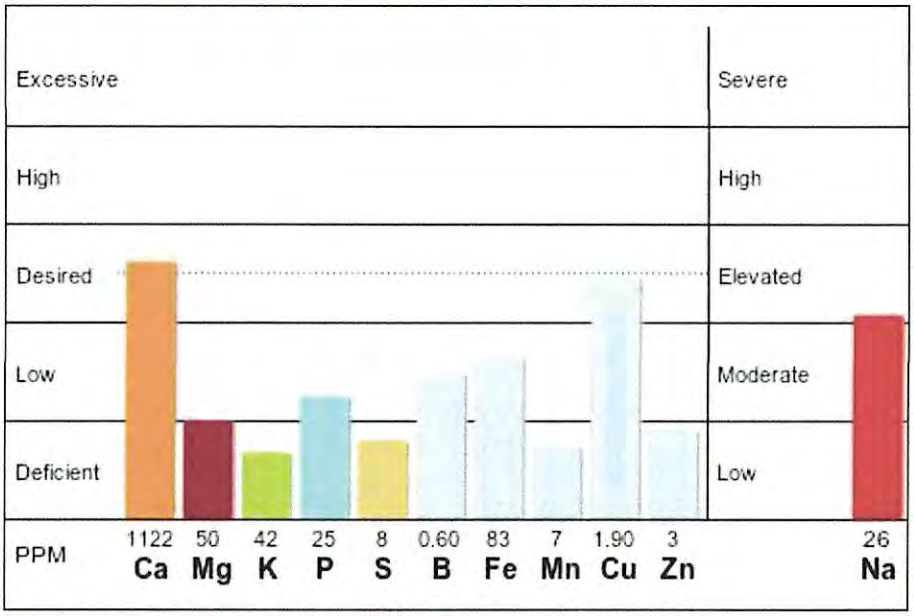
Conducted by The Ninemire Group LLC

Client: Rehoboth Christian College

Field Representative: Steve Jones

Date of Analysis: April 7, 2020

SOIL NUTRIENT STATUS: PRIMARY LAWN



Organic Matter (humus) 1.6%

pH (H_2O 1:5) 7.8

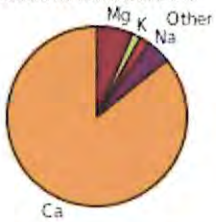
Conductivity (mmhos/cm) 0.04

Total Exchange Capacity 6.5

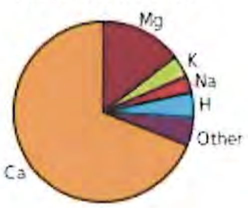
BASE SATURATION: KEY ELEMENTS

	Actuals
Ca	85.85%
Mg	6.4%
K	1.63%
Na	1.72%
H	0.0%
Other	4.4%

Actual Saturation



Ideal Saturation



Ideals	
68-72%	Ca
13-16%	Mg
3-5%	K
<3%	Na
4.50%	H
5%	Other

COMMENTS

These numbers are to correct soil deficiencies only. Nutrient losses such as leaching or plant uptake should be considered when formulating maintenance programs.

Kg per Ha of Calcium deficient	0	
Kg per Ha of Magnesium deficient	96	Apply a total of **5.7** Kg per 100 m² of a 17% Mg material over an appropriate number of applications.
Kg per Ha of Potassium deficient	89	Apply a total of **2.1** Kg per 100 m² of a 0-0-42 material over an appropriate number of applications.
Kg per Ha of Phosphorus deficient	37	Apply a total of **1.7** Kg per 100 m² of a 11-22-0 material over an appropriate number of applications.

Soil Nutrient Analysis Report

Customer	REHOBOTH CHRISTIAN COLLEGE	Report Name	PRIMARY LAWN
Dominant Species	Kikuyu	Surface Type	Lawn
Reporting Date	9/04/2020	Territory Manager	STEPHEN JONES

The Soil Nutrient Analysis has been completed, the results and recommendations based on averages of all samples are as follows;

1. Physical and Chemical Properties

Organic Matter (Humus)

The level of soil organic matter was relatively low in the samples. This could be resulting in nutrient leaching, and reducing the water holding capacity of the soil. To bring the organic matter content to an adequate level the use of organic based fertilisers and amendments is recommended.

Sample Result: 1.6 % **Interpretation:** Low

Soil pH

The average pH level in the samples was high. This is a neutral to slightly alkaline pH, at this level nutrients such as Fe, Mn, B, Cu, ZN and P start to become unavailable. To lower the pH to the optimum level, applications of sulphur based products can be carried out.

Sample Result: 7.8 pH **Interpretation:** High

Electrical Conductivity (EC)

The average EC reading was low within the samples. A low EC means there is a lack of soluble salts (nutrients) in the profile and could indicate leaching of nutrients.

Sample Result: 0.04 dS/m **Interpretation:** Low

Total Exchange Capacity (TEC)

The TEC level was adequate in the samples. This indicates that nutrients are available to the plant in the root zone. To maintain the TEC at this level continue to use humus based products regularly throughout the year.

Sample Result: 6.5 meq/100mL **Interpretation:** Desirable

2. Nutrients

Calcium (Ca)

On average calcium (Ca) levels in the samples were high. Calcium is a dominant cation and high levels can prevent other nutrients such as magnesium from occupying exchange sites in the profile. It is important to maintain a balanced Ca - Mg ratio of about 75 : 15 to ensure optimum soil structure and plant health.

Sample Result:	85.85 %	**Interpretation:**	High

Magnesium (Mg)

The average magnesium (Mg) levels were very low within the samples. Magnesium is a cation that is vital for the plant to photosynthesise, and is (along with calcium) an important component of a good soil structure. It is likely that the turf plant is suffering from the lack of magnesium. Low magnesium can allow for the build up of undesirable cations such as sodium.

Sample Result:	6.4 %	**Interpretation:**	Very Low

Potassium (K)

On average potassium (K) levels were low within the samples. It is important to keep potassium at optimum levels within the profile as it is generally required in large amounts by the plant (second to nitrogen). Potassium is the main nutrient required for stress tolerance, by hardening cell walls it increases resistance to disease and pest attack. Potassium is easily leached from the profile so it is important to maintain yearly applications

Sample Result:	1.63 %	**Interpretation:**	Low

Phosphorus (P)

On average phosphorus (P) levels were low in the samples. Phosphorus is used by the plant in the transfer and storage of energy. It is also required to make vital acids and compounds used for plant growth and root development.

Sample Result:	25 ppm	**Interpretation:**	Low

Sodium (Na)

The average sodium (Na) levels were adequate within the samples. Sodium is destructive to turf soils, causing poor soil structure, limiting drainage and reducing oxygen levels in the root zone. Good calcium and magnesium levels help to reduce sodium in the profile by displacing it on cation exchange sites.

Sample Result:	1.72 %	**Interpretation:**	Desirable

Hydrogen (H)

The proportion of hydrogen (h) in the base saturation percentage is desirable. The level of hydrogen is driven by soil pH, with a lower pH resulting in a higher proportion of hydrogen in relation to other cations. While hydrogen does not necessarily impact on the plant directly, it does occupy valuable exchange sites, reducing the presence of beneficials such as Ca, Mg and K.

Sample Result:	0 %	**Interpretation:**	Desirable

3. Micronutrients

Iron (Fe)

Average iron (Fe) levels within the samples were low. Iron is the key nutrient required for the production of chlorophyll. Low iron could be reducing the plants ability to photosynthesise and exhibiting symptoms of chlorosis (yellowing of foliage). Often iron is high within the soil, but is largely unavailable to the plant due to excessive P levels or high soil pH.

Sample Result:	83 ppm	**Interpretation:**	Low

Boron (B)

Average boron (B) levels within the samples were low. Boron is important for plant growth as it is required for cell wall formation within plants. Without Boron, root cell elongation and activity is unable to occur or is limited, affecting plant growth and development.

Sample Result:	0.6 ppm	**Interpretation:**	Low

Sulphur (S)

Average sulphur (S) levels within the samples were low. Sulphur is an important nutrient for the amino acids and chlorophyll. Low sulphur levels could be limiting the plants ability to photosynthesise, resulting in a general lack of growth vigour.

Sample Result:	8 ppm	**Interpretation:**	Low

Manganese (Mn)

Average manganese (Mn) levels within the samples were low. Like iron, manganese is used by the plant to produce chlorophyll. Low levels can result in a general lack in vigour due to the plants inability to effectively generate energy.

Sample Result:	7 ppm	**Interpretation:**	Low

Copper (Cu)

Average copper (Cu) levels within the samples were in the desirable range. Like zinc, copper is required by the plant in small quantities to form certain hormones and enzymes. Low copper levels can result in a lack of new growth and the dying off of new tillers.

Sample Result:	1.9 ppm	**Interpretation:**	Desirable

Zinc (Zn)

Zinc (Zn) levels within the samples were low. Zinc is required by turf grass in small quantities for the development of certain growth hormones.

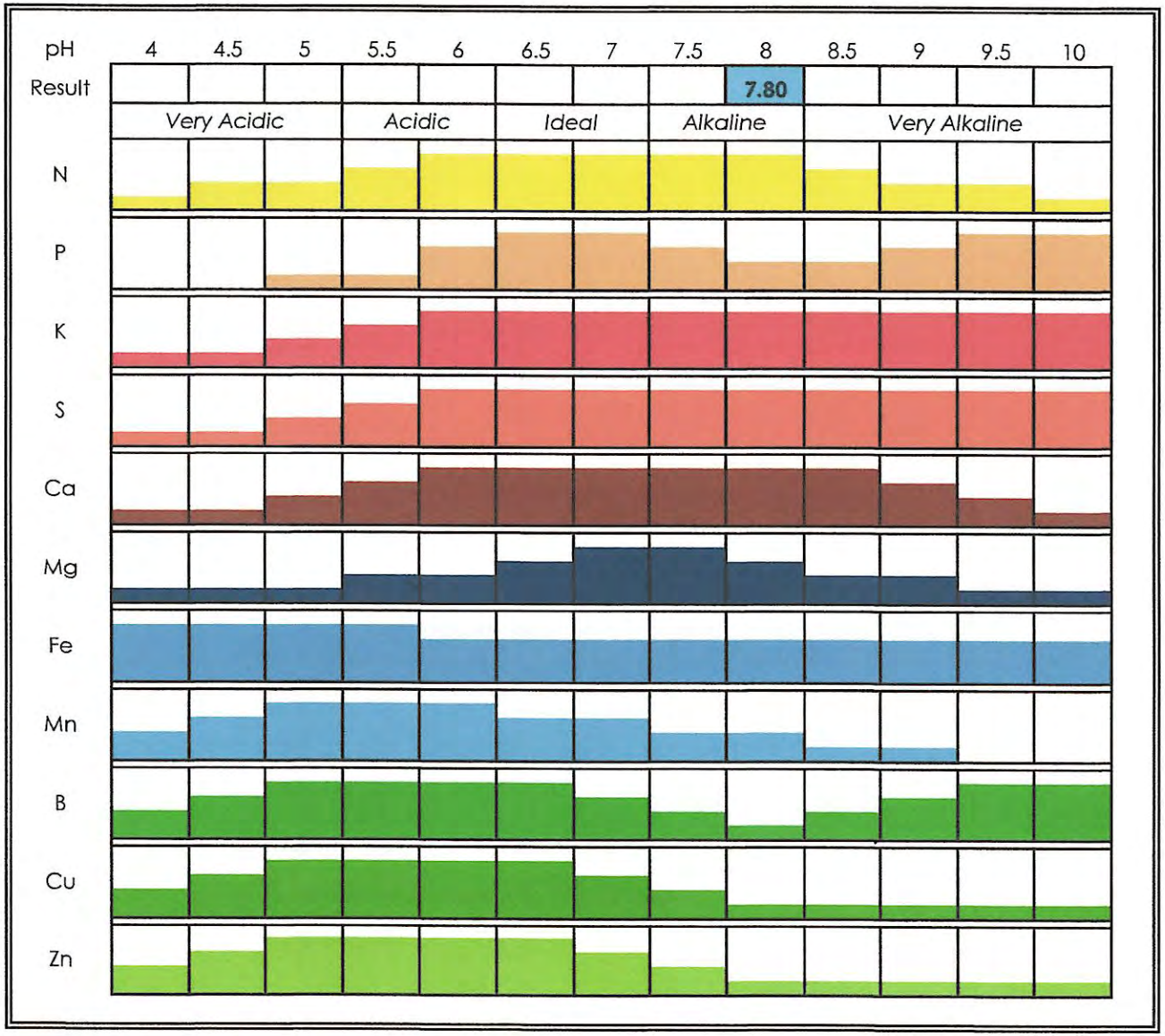
Sample Result:	3 ppm	**Interpretation:**	Low

4. Nutrient Availability as Influenced by Soil pH

Sample ID:	PRIMARY LAWN

Date:	9-Apr-20

Sample Result (H_20 1:5): 7.80



This chart indicates the availability of different nutrients to the plant, dependent on the soil pH level. pH governs the solubility and hence the availability of nutrients in solution. Ideal soil pH for turfgrass is between 6.5 - 7.5.

Pro-Dolomite

KEY POINTS

- Rebuilds tired and worn soils through remineralisation
- Builds critical levels of many trace elements
- Increases soil carbon levels for energy, water and nutrient holding capacity
- Increases the ability for plants & turf to resist pest and disease attack
- Greater biological activity in the soil promotes availability of both target and other tied-up nutrients in the soil

*Improved soil health reduces input costs through efficiency.

ACTIVATED RESPONSE

Natural Dolomite extracted with precision and finely ground. Uniquely prilled and screened for ease of use in conditioning soil. Precision manufactured to ensure the full benefit calcium and magnesium in any soil conditioning operation.

TYPICAL ANALYSIS (w/w)

Calcium	17.4%
Magnesium	10%

PRODUCT SPECIFICATIONS

Powder	0-2 mm
Granular Grade	1-2 mm
Granular Grade	2-4 mm

QUANTITY SIZES (PER 1000KG)

Loose Bulk • 1t Bulk Bags • 25kg Bags • 20kg Bags

Manufactured by FertPro Manufacturing Pty Ltd
66 Chum Street, New Chum, QLD 4303
07 3282 0761

GREENWAY TURF SOLUTIONS

Blended in South Australia

GTS is Proud to Support Manufacturing in South Australia

GTS 23 - 2 - 13 + Fe
SPORTS TURF FERTILISER

GTS 23-2-13 + Fe is a high quality slow release sports turf fertiliser that is ideal for maintenance applications, sustained growth and plant conditioning.

ANALYSIS	
NITROGEN (N) TOTAL %	23.0
As Ammonium	6.1
As Urea	5.5
As XCU Slow Release N	11.4
SLOW RELEASE NITROGEN (N) %	50.0
PHOSPHORUS (P) TOTAL %	2.1
As Water Soluble	1.8
As Citrate Soluble	0.2
As Citrate Insoluble	0.1
POTASSIUM (K) TOTAL %	13.0
As Muriate	13.0
SULPHUR (S) %	5.3
IRON (Fe) as Sucrate %	2.5
Application Rate: 150 - 250Kg / Ha	

Key Technologies

Iron as Sucrate

All Greenway Turf Solutions Sports Turf Fertilisers containing iron and/or manganese deliver these nutrients in the sucrate form. Sucrates are carbohydrates that provide energy to plants. This form of delivery results in more efficient plant nutrient uptake and does not stain non-target areas such as pathways like other forms of iron.

XCU
Slow-Release Fertilizer

The XCU slow-release nitrogen technology used in GTS Sport Turf Fertilisers provides gradual, steady nutritional uptake for up to 10 weeks of plant response.

XCU is a coated urea product. The outer layers consist of a thin coating of elemental sulphur and polymer wax, which work together to protect the inner polymer coating. This inner layer consists of a cross- linked polymer film that protects the urea granule.

ADVANCED DUAL COATING TECHNOLOGY

1. **Less sulphur coating** reduces N lock-off and delivers more N.
2. **Coating integrity** is maintained during transport, blending, bagging and application.
3. **Outer layers** consist of a thin coating of elemental sulphur and polymer wax, which work together to protect the inner polymer coating.
4. **Inner layer** consists of a thin, cross-linked polymer film that encapsulates and protects the urea granule.

Available from Turfgrass Solutions Australia

Stephen Jones
Mobile: 0429 205 236
Email: info@turfgrasssolutions.com.au

www.greenwayturfsolutions.com

SOIL ANALYSIS REPORTS

FROM

GREENWAY TURF SOLUTIONS

REHOBOTH CHRISTIAN COLLEGE

MAIN OVAL, PRIMARY LAWN, GYM AREA

KENWICK

Prepared By Stephen Jones

WA State Manager – GTS

9-9-2020

MAIN OVAL

Standard Soil Analysis (Mehlich III Extraction)

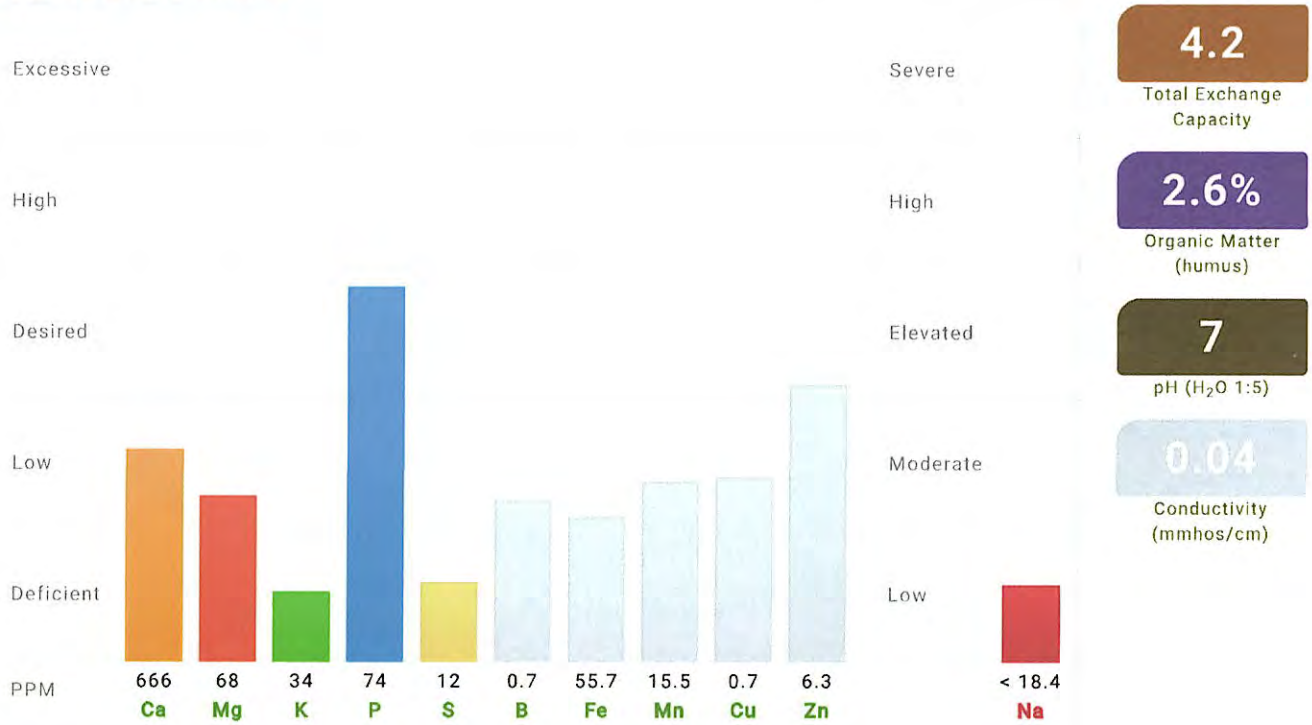
Performed by **The NINEMIRE GROUP**

Client:
Rehoboth Christian College

Field Representative:
Steve Jones

Date of Analysis:
9/9/2020

Soil Nutrient Status



4.2
Total Exchange Capacity

2.6%
Organic Matter (humus)

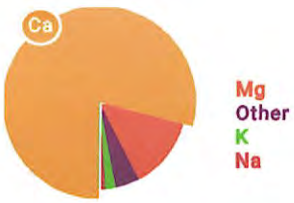
7
pH (H_2O 1:5)

0.04
Conductivity (mmhos/cm)

Base Saturation: Key Elements

	Actuals
Ca	79%
Mg	13.4%
K	2.1%
Na	1.2%
H	0%
Other	4.4%

Actual Saturation



Ideal Saturation

Ideals	
68-72%	Ca
13-16%	Mg
3-5%	K
<3%	Na
4.50%	H
5%	Other

Kg per Ha of Calcium deficient	648
Kg per Ha of Magnesium deficient	108
Kg per Ha of Potassium deficient	218
Kg per Ha of Phosphorus deficient	0

Apply a total of **28.17** Kg per 100m² of Tru-Gyp over an appropriate number of applications

Apply a total of **6.75** Kg per 100m² of Soilfix Mg over an appropriate number of applications

Apply a total of **13.63** Kg per 100m² of Activate K over an appropriate number of applications

These numbers are to correct soil deficiencies only. Nutrient losses such as leaching or plant uptake should be considered when formulating maintenance programs. TX Trace may be required to increase levels of iron, manganese, or both.

Soil Nutrient Analysis Report

Customer	REHOBOTH CHRISTIAN COLLEGE	Report Name	MAIN OVAL
Dominant Species	Couch Grass	Surface Type	Oval
Reporting Date	9/09/2020	Territory Manager	STEPHEN JONES

The Soil Nutrient Analysis has been completed, the results and recommendations based on averages of all samples are as follows;

1. Physical and Chemical Properties

Organic Matter (Humus)

The level of soil organic matter was relatively low in the samples. This could be resulting in nutrient leaching, and reducing the water holding capacity of the soil. To bring the organic matter content to an adequate level the use of organic based fertilisers and amendments is recommended.

Sample Result:	2.6 %	**Interpretation:**	Low

Soil pH

The average pH level in the samples was adequate. This is a slightly acidic to neutral pH, at this level all nutrients will be available to the plant.

Sample Result:	7 pH	**Interpretation:**	Desirable

Electrical Conductivity (EC)

The average EC reading was low within the samples. A low EC means there is a lack of soluble salts (nutrients) in the profile and could indicate leaching of nutrients.

Sample Result:	0.04 dS/m	**Interpretation:**	Low

Total Exchange Capacity (TEC)

The TEC level was low in the samples. This could be partly due to the lack of organic matter within the soil profile. To raise the TEC the use of humus based products is recommended, this will increase the amount of colloids available as exchange sites.

Sample Result:	4.2 meq/100mL	**Interpretation:**	Low

2. Nutrients

Calcium (Ca)

On average calcium (Ca) levels in the samples were high. Calcium is a dominant cation and high levels can prevent other nutrients such as magnesium from occupying exchange sites in the profile. It is important to maintain a balanced Ca - Mg ratio of about 75 : 15 to ensure optimum soil structure and plant health.

Sample Result:	79 %	**Interpretation:**	High

Magnesium (Mg)

The average magnesium (Mg) levels in the samples were in the desired range. As magnesium is vital for photosynthesis and other functions in the turf plant, it is important to maintain the magnesium level within this desirable range.

Sample Result:	13.4 %	**Interpretation:**	Desirable

Potassium (K)

On average potassium (K) levels were low within the samples. It is important to keep potassium at optimum levels within the profile as it is generally required in large amounts by the plant (second to nitrogen). Potassium is the main nutrient required for stress tolerance, by hardening cell walls it increases resistance to disease and pest attack. Potassium is easily leached from the profile so it is important to maintain yearly applications

Sample Result:	2.1 %	**Interpretation:**	Low

Phosphorus (P)

On average phosphorus (P) levels were low in the samples. Phosphorus is used by the plant in the transfer and storage of energy. It is also required to make vital acids and compounds used for plant growth and root development.

Sample Result:	74 ppm	**Interpretation:**	Low

Sodium (Na)

The average sodium (Na) levels were adequate within the samples. Sodium is destructive to turf soils, causing poor soil structure, limiting drainage and reducing oxygen levels in the root zone. Good calcium and magnesium levels help to reduce sodium in the profile by displacing it on cation exchange sites.

Sample Result:	1.2 %	**Interpretation:**	Desirable

Hydrogen (H)

The proportion of hydrogen (h) in the base saturation percentage is desirable. The level of hydrogen is driven by soil pH, with a lower pH resulting in a higher proportion of hydrogen in relation to other cations. While hydrogen does not necessarily impact on the plant directly, it does occupy valuable exchange sites, reducing the presence of beneficials such as Ca, Mg and K.

Sample Result:	0 %	**Interpretation:**	Desirable

3. Micronutrients

Iron (Fe)

Average iron (Fe) levels within the samples were low. Iron is the key nutrient required for the production of chlorophyll. Low iron could be reducing the plants ability to photosynthesise and exhibiting symptoms of chlorosis (yellowing of foliage). Often iron is high within the soil, but is largely unavailable to the plant due to excessive P levels or high soil pH.

Sample Result:	55.7 ppm	**Interpretation:**	Low

Boron (B)

Average boron (B) levels within the samples were low. Boron is important for plant growth as it is required for cell wall formation within plants. Without Boron, root cell elongation and activity is unable to occur or is limited, affecting plant growth and development.

Sample Result:	0.7 ppm	**Interpretation:**	Low

Sulphur (S)

Average sulphur (S) levels within the samples were low. Sulphur is an important nutrient for the amino acids and chlorophyll. Low sulphur levels could be limiting the plants ability to photosynthesise, resulting in a general lack of growth vigour.

Sample Result:	12 ppm	**Interpretation:**	Low

Manganese (Mn)

Average manganese (Mn) levels within the samples were low. Like iron, manganese is used by the plant to produce chlorophyll. Low levels can result in a general lack in vigour due to the plants inability to effectively generate energy.

Sample Result:	15.5 ppm	**Interpretation:**	Low

Copper (Cu)

Average copper (Cu) levels within the samples were low. Like zinc, copper is required by the plant in small quantities to form certain hormones and enzymes. Low copper levels can result in a lack of new growth and the dying off of new tillers.

Sample Result:	0.7 ppm	**Interpretation:**	Low

Zinc (Zn)

Zinc (Zn) levels within the samples were low. Zinc is required by turf grass in small quantities for the development of certain growth hormones.

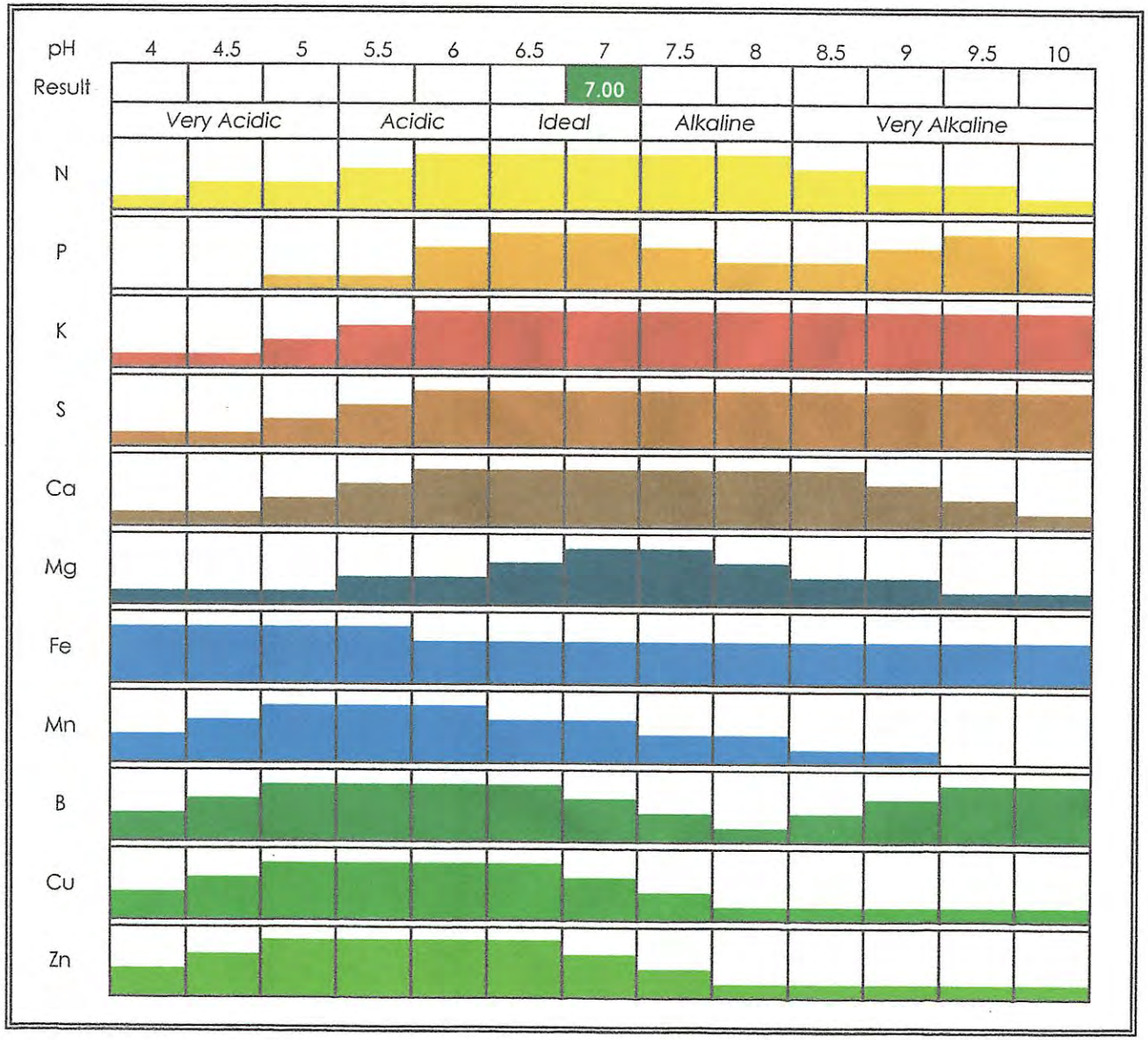
Sample Result:	6.3 ppm	**Interpretation:**	Low

4. Nutrient Availability as Influenced by Soil pH

Sample ID:	MAIN OVAL

Date:	9-Sep-20

Sample Result (H_20 1:5): 7.00



This chart indicates the availability of different nutrients to the plant, dependent on the soil pH level. pH governs the solubility and hence the availability of nutrients in solution. Ideal soil pH for turfgrass is between 6.5 - 7.5.

PRIMARY LAWN

Standard Soil Analysis (Mehlich III Extraction)

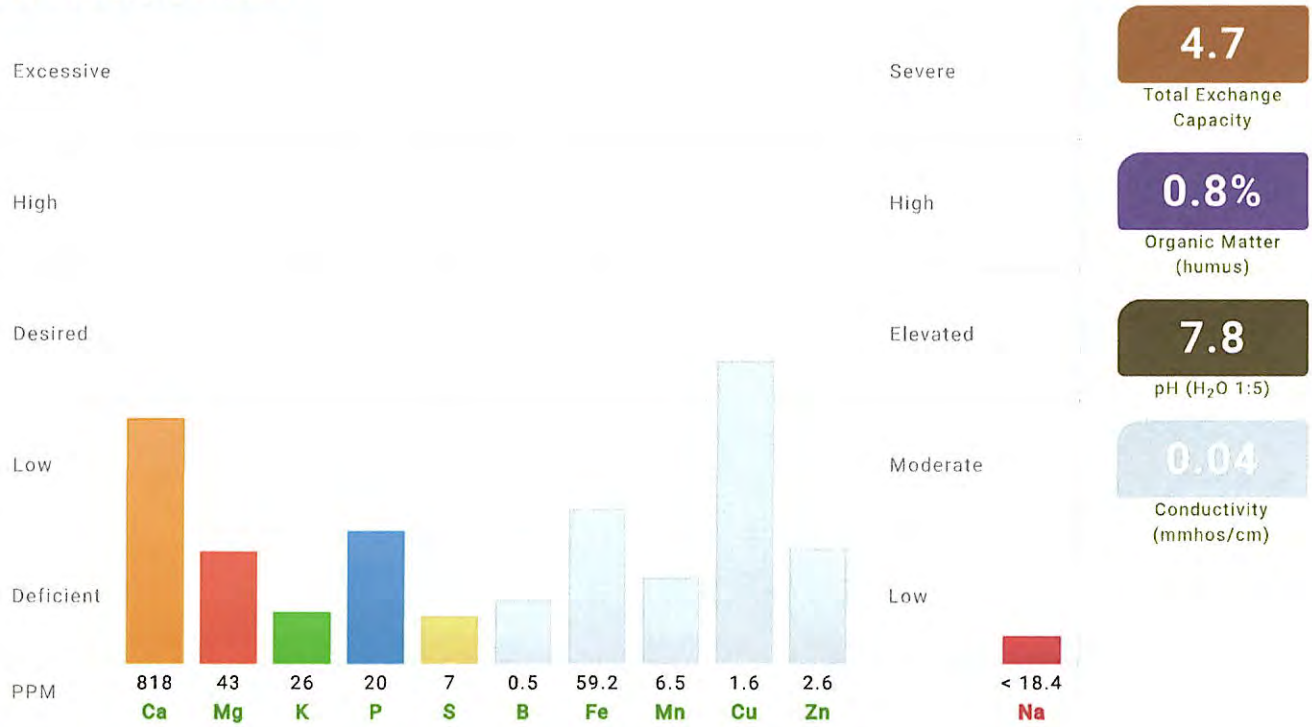
Performed by **The NINEMIRE GROUP**

Client:
Rehoboth Christian College

Field Representative:
Steve Jones

Date of Analysis:
9/9/2020

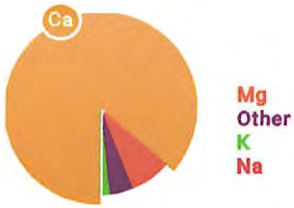
Soil Nutrient Status



Base Saturation: Key Elements

	Actuals
Ca	86.2%
Mg	7.6%
K	1.4%
Na	0.4%
H	0%
Other	4.4%

Actual Saturation



Ideal Saturation

Ideals	
68-72%	Ca
13-16%	Mg
3-5%	K
<3%	Na
4.50%	H
5%	Other

Kg per Ha of Calcium deficient	421
Kg per Ha of Magnesium deficient	145
Kg per Ha of Potassium deficient	230
Kg per Ha of Phosphorus deficient	60

Apply a total of **18.30** Kg per 100m² of Tru-Gyp over an appropriate number of applications

Apply a total of **9.06** Kg per 100m² of Soilfix Mg over an appropriate number of applications

Apply a total of **14.38** Kg per 100m² of Activate K over an appropriate number of applications

Apply a total of **6.00** Kg per 100m² of GreenStart Elite 12-10-11 over an appropriate number of applications

These numbers are to correct soil deficiencies only. Nutrient losses such as leaching or plant uptake should be considered when formulating maintenance programs. TX Trace may be required to increase levels of iron, manganese, or both.

Soil Nutrient Analysis Report

Customer	REHOBOTH CHRISTIAN COLLEGE	Report Name	PRIMARY LAWN
Dominant Species	Kikuyu	Surface Type	Lawn
Reporting Date	9/09/2020	Territory Manager	STEPHEN JONES

The Soil Nutrient Analysis has been completed, the results and recommendations based on averages of all samples are as follows;

1. Physical and Chemical Properties

Organic Matter (Humus)

The level of soil organic matter was relatively low in the samples. This could be resulting in nutrient leaching, and reducing the water holding capacity of the soil. To bring the organic matter content to an adequate level the use of organic based fertilisers and amendments is recommended.

Sample Result:	0.8 %	**Interpretation:**	Low

Soil pH

The average pH level in the samples was high. This is a neutral to slightly alkaline pH, at this level nutrients such as Fe, Mn, B, Cu, ZN and P start to become unavailable. To lower the pH to the optimum level, applications of sulphur based products can be carried out.

Sample Result:	7.8 pH	**Interpretation:**	High

Electrical Conductivity (EC)

The average EC reading was low within the samples. A low EC means there is a lack of soluble salts (nutrients) in the profile and could indicate leaching of nutrients.

Sample Result:	0.04 dS/m	**Interpretation:**	Low

Total Exchange Capacity (TEC)

The TEC level was low in the samples. This could be partly due to the lack of organic matter within the soil profile. To raise the TEC the use of humus based products is recommended, this will increase the amount of colloids available as exchange sites.

Sample Result:	4.7 meq/100mL	**Interpretation:**	Low

2. Nutrients

Calcium (Ca)

On average calcium (Ca) levels in the samples were very high. Calcium is a dominant cation and high levels can prevent other nutrients such as magnesium from occupying exchange sites in the profile. It is important to maintain a balanced Ca - Mg ratio of about 75 : 15 to ensure optimum soil structure and plant health.

Sample Result:	86.2 %	**Interpretation:**	Very High

Magnesium (Mg)

The average magnesium (Mg) levels were very low within the samples. Magnesium is a cation that is vital for the plant to photosynthesise, and is (along with calcium) an important component of a good soil structure. It is likely that the turf plant is suffering from the lack of magnesium. Low magnesium can allow for the build up of undesirable cations such as sodium.

Sample Result:	7.6 %	**Interpretation:**	Very Low

Potassium (K)

On average potassium (K) levels were low within the samples. It is important to keep potassium at optimum levels within the profile as it is generally required in large amounts by the plant (second to nitrogen). Potassium is the main nutrient required for stress tolerance, by hardening cell walls it increases resistance to disease and pest attack. Potassium is easily leached from the profile so it is important to maintain yearly applications

Sample Result:	1.4 %	**Interpretation:**	Low

Phosphorus (P)

On average phosphorus (P) levels were low in the samples. Phosphorus is used by the plant in the transfer and storage of energy. It is also required to make vital acids and compounds used for plant growth and root development.

Sample Result:	20 ppm	**Interpretation:**	Low

Sodium (Na)

The average sodium (Na) levels were adequate within the samples. Sodium is destructive to turf soils, causing poor soil structure, limiting drainage and reducing oxygen levels in the root zone. Good calcium and magnesium levels help to reduce sodium in the profile by displacing it on cation exchange sites.

Sample Result:	0.4 %	**Interpretation:**	Desirable

Hydrogen (H)

The proportion of hydrogen (h) in the base saturation percentage is desirable. The level of hydrogen is driven by soil pH, with a lower pH resulting in a higher proportion of hydrogen in relation to other cations. While hydrogen does not necessarily impact on the plant directly, it does occupy valuable exchange sites, reducing the presence of beneficials such as Ca, Mg and K.

Sample Result:	0 %	**Interpretation:**	Desirable

3. Micronutrients

Iron (Fe)

Average iron (Fe) levels within the samples were low. Iron is the key nutrient required for the production of chlorophyll. Low iron could be reducing the plants ability to photosynthesise and exhibiting symptoms of chlorosis (yellowing of foliage). Often iron is high within the soil, but is largely unavailable to the plant due to excessive P levels or high soil pH.

Sample Result:	59.2 ppm	**Interpretation:**	Low

Boron (B)

Average boron (B) levels within the samples were low. Boron is important for plant growth as it is required for cell wall formation within plants. Without Boron, root cell elongation and activity is unable to occur or is limited, affecting plant growth and development.

Sample Result:	0.5 ppm	**Interpretation:**	Low

Sulphur (S)

Average sulphur (S) levels within the samples were low. Sulphur is an important nutrient for the amino acids and chlorophyll. Low sulphur levels could be limiting the plants ability to photosynthesise, resulting in a general lack of growth vigour.

Sample Result:	7 ppm	**Interpretation:**	Low

Manganese (Mn)

Average manganese (Mn) levels within the samples were low. Like iron, manganese is used by the plant to produce chlorophyll. Low levels can result in a general lack in vigour due to the plants inability to effectively generate energy.

Sample Result:	6.5 ppm	**Interpretation:**	Low

Copper (Cu)

Average copper (Cu) levels within the samples were in the desirable range. Like zinc, copper is required by the plant in small quantities to form certain hormones and enzymes. Low copper levels can result in a lack of new growth and the dying off of new tillers.

Sample Result:	1.6 ppm	**Interpretation:**	Desirable

Zinc (Zn)

Zinc (Zn) levels within the samples were low. Zinc is required by turf grass in small quantities for the development of certain growth hormones.

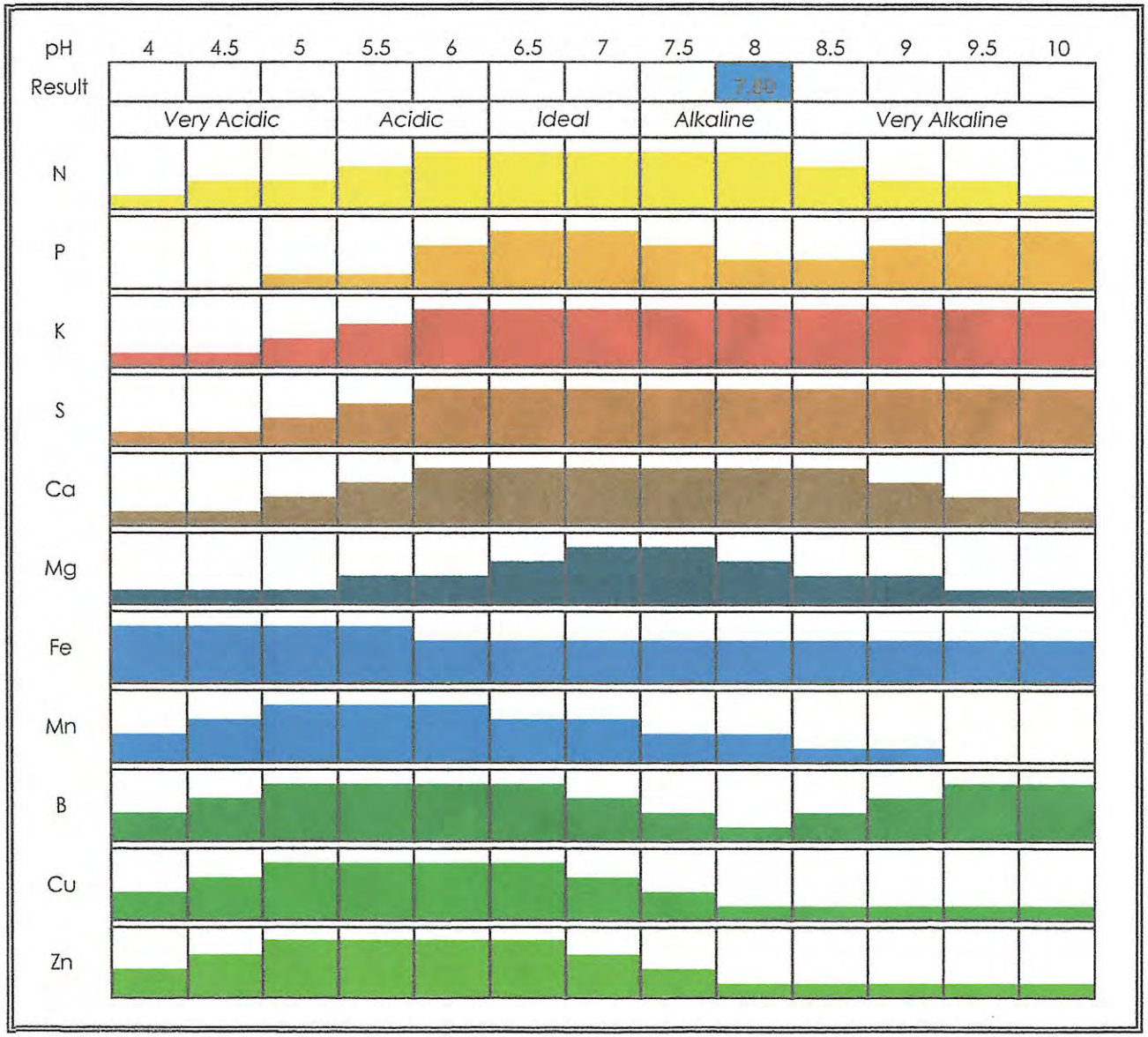
Sample Result:	2.6 ppm	**Interpretation:**	Low

4. Nutrient Availability as Influenced by Soil pH

Sample ID:	PRIMARY LAWN

Date:	9-Sep-20

Sample Result (H_20 1:5): 7.80



This chart indicates the availability of different nutrients to the plant, dependent on the soil pH level. pH governs the solubility and hence the availability of nutrients in solution. Ideal soil pH for turfgrass is between 6.5 - 7.5.

GYM LAWN

Standard Soil Analysis (Mehlich III Extraction)

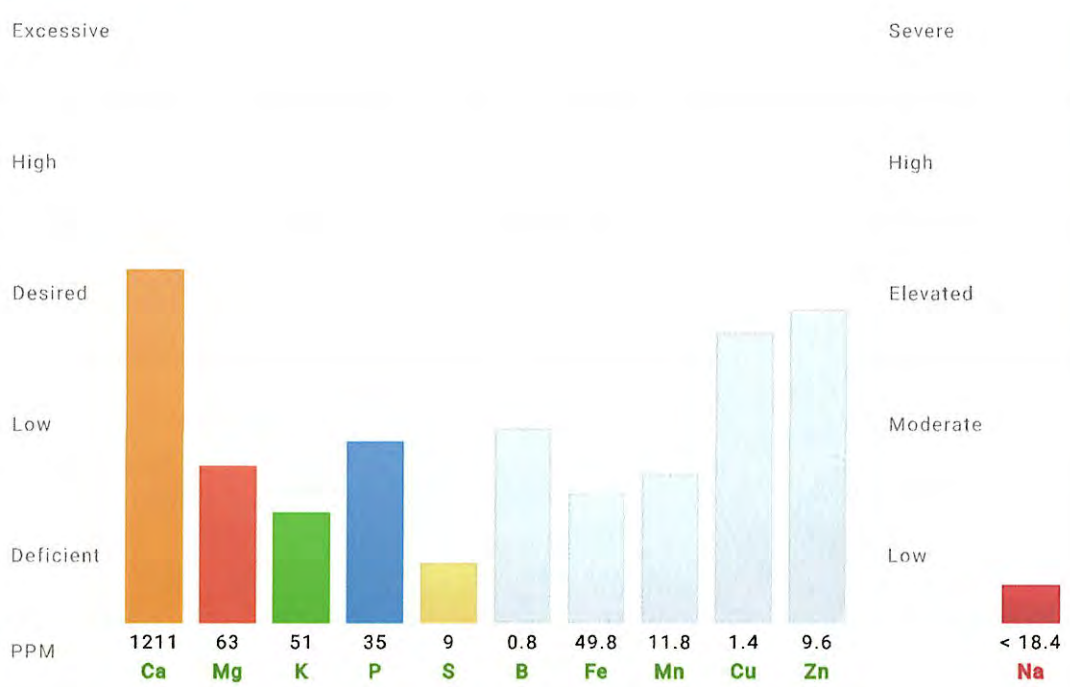
Performed by **The NINEMIRE GROUP**

Client:
Rehoboth Christian College

Field Representative:
Steve Jones

Date of Analysis:
9/9/2020

Soil Nutrient Status



7.1
Total Exchange Capacity

2%
Organic Matter (humus)

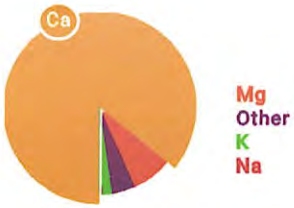
7.9
pH (H_2O 1:5)

0.07
Conductivity (mmhos/cm)

Base Saturation: Key Elements

	Actuals
Ca	85.8%
Mg	7.4%
K	1.9%
Na	0.6%
H	0%
Other	4.4%

Actual Saturation



Ideal Saturation

Ideals	
68-72%	Ca
13-16%	Mg
3-5%	K
<3%	Na
4.50%	H
5%	Other

Kg per Ha of Calcium deficient	0
Kg per Ha of Magnesium deficient	115
Kg per Ha of Potassium deficient	193
Kg per Ha of Phosphorus deficient	37

Apply a total of **7.19** Kg per 100m² of Soilfix Mg over an appropriate number of applications

Apply a total of **12.06** Kg per 100m² of Activate K over an appropriate number of applications

Apply a total of **3.70** Kg per 100m² of GreenStart Elite 12-10-11 over an appropriate number of applications

These numbers are to correct soil deficiencies only. Nutrient losses such as leaching or plant uptake should be considered when formulating maintenance programs. TX Trace may be required to increase levels of iron, manganese, or both.

Soil Nutrient Analysis Report

Customer	REHOBOTH CHRISTIAN COLLEGE	Report Name	GYM LAWN
Dominant Species	Kikuyu	Surface Type	Lawn
Reporting Date	9/09/2020	Territory Manager	STEPHEN JONES

The Soil Nutrient Analysis has been completed, the results and recommendations based on averages of all samples are as follows;

1. Physical and Chemical Properties

Organic Matter (Humus)

The level of soil organic matter was relatively low in the samples. This could be resulting in nutrient leaching, and reducing the water holding capacity of the soil. To bring the organic matter content to an adequate level the use of organic based fertilisers and amendments is recommended.

Sample Result:	2 %	**Interpretation:**	Low

Soil pH

The average pH level in the samples was high. This is a neutral to slightly alkaline pH, at this level nutrients such as Fe, Mn, B, Cu, ZN and P start to become unavailable. To lower the pH to the optimum level, applications of sulphur based products can be carried out.

Sample Result:	7.9 pH	**Interpretation:**	High

Electrical Conductivity (EC)

The average EC reading was low within the samples. A low EC means there is a lack of soluble salts (nutrients) in the profile and could indicate leaching of nutrients.

Sample Result:	0.07 dS/m	**Interpretation:**	Low

Total Exchange Capacity (TEC)

The TEC level was adequate in the samples. This indicates that nutrients are available to the plant in the root zone. To maintain the TEC at this level continue to use humus based products regularly throughout the year.

Sample Result:	7.1 meq/100mL	**Interpretation:**	Desirable

2. Nutrients

Calcium (Ca)

On average calcium (Ca) levels in the samples were high. Calcium is a dominant cation and high levels can prevent other nutrients such as magnesium from occupying exchange sites in the profile. It is important to maintain a balanced Ca - Mg ratio of about 75 : 15 to ensure optimum soil structure and plant health.

Sample Result:	85.8 %	**Interpretation:**	High

Magnesium (Mg)

The average magnesium (Mg) levels were very low within the samples. Magnesium is a cation that is vital for the plant to photosynthesise, and is (along with calcium) an important component of a good soil structure. It is likely that the turf plant is suffering from the lack of magnesium. Low magnesium can allow for the build up of undesirable cations such as sodium.

Sample Result:	7.4 %	**Interpretation:**	Very Low

Potassium (K)

On average potassium (K) levels were low within the samples. It is important to keep potassium at optimum levels within the profile as it is generally required in large amounts by the plant (second to nitrogen). Potassium is the main nutrient required for stress tolerance, by hardening cell walls it increases resistance to disease and pest attack. Potassium is easily leached from the profile so it is important to maintain yearly applications

Sample Result:	1.9 %	**Interpretation:**	Low

Phosphorus (P)

On average phosphorus (P) levels were low in the samples. Phosphorus is used by the plant in the transfer and storage of energy. It is also required to make vital acids and compounds used for plant growth and root development.

Sample Result:	35 ppm	**Interpretation:**	Low

Sodium (Na)

The average sodium (Na) levels were adequate within the samples. Sodium is destructive to turf soils, causing poor soil structure, limiting drainage and reducing oxygen levels in the root zone. Good calcium and magnesium levels help to reduce sodium in the profile by displacing it on cation exchange sites.

Sample Result:	0.6 %	**Interpretation:**	Desirable

Hydrogen (H)

The proportion of hydrogen (h) in the base saturation percentage is desirable. The level of hydrogen is driven by soil pH, with a lower pH resulting in a higher proportion of hydrogen in relation to other cations. While hydrogen does not necessarily impact on the plant directly, it does occupy valuable exchange sites, reducing the presence of beneficials such as Ca, Mg and K.

Sample Result:	0 %	**Interpretation:**	Desirable

3. Micronutrients

Iron (Fe)

Average iron (Fe) levels within the samples were low. Iron is the key nutrient required for the production of chlorophyll. Low iron could be reducing the plants ability to photosynthesise and exhibiting symptoms of chlorosis (yellowing of foliage). Often iron is high within the soil, but is largely unavailable to the plant due to excessive P levels or high soil pH.

Sample Result:	49.8 ppm	**Interpretation:**	Low

Boron (B)

Average boron (B) levels within the samples were low. Boron is important for plant growth as it is required for cell wall formation within plants. Without Boron, root cell elongation and activity is unable to occur or is limited, affecting plant growth and development.

Sample Result:	0.8 ppm	**Interpretation:**	Low

Sulphur (S)

Average sulphur (S) levels within the samples were low. Sulphur is an important nutrient for the amino acids and chlorophyll. Low sulphur levels could be limiting the plants ability to photosynthesise, resulting in a general lack of growth vigour.

Sample Result:	9 ppm	**Interpretation:**	Low

Manganese (Mn)

Average manganese (Mn) levels within the samples were low. Like iron, manganese is used by the plant to produce chlorophyll. Low levels can result in a general lack in vigour due to the plants inability to effectively generate energy.

Sample Result:	11.8 ppm	**Interpretation:**	Low

Copper (Cu)

Average copper (Cu) levels within the samples were in the desirable range. Like zinc, copper is required by the plant in small quantities to form certain hormones and enzymes. Low copper levels can result in a lack of new growth and the dying off of new tillers.

Sample Result:	1.4 ppm	**Interpretation:**	Desirable

Zinc (Zn)

Zinc (Zn) levels within the samples were in the desired range. Zinc is required by turf grass in small quantities for the development of certain growth hormones.

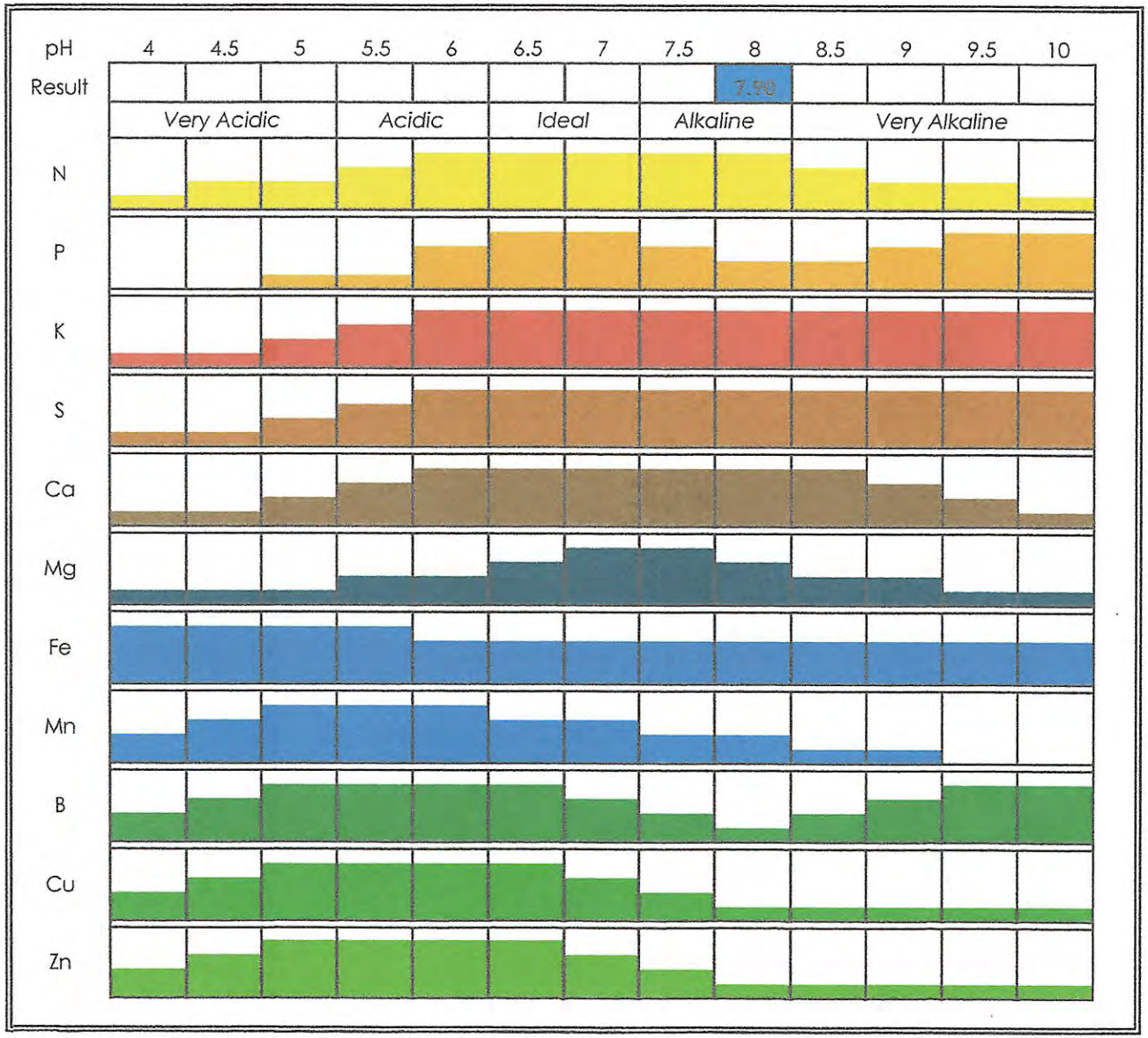
Sample Result:	9.6 ppm	**Interpretation:**	Desirable

4. Nutrient Availability as Influenced by Soil pH

Sample ID:	GYM LAWN

Date:	9-Sep-20

Sample Result (H_20 1:5): 7.90



This chart indicates the availability of different nutrients to the plant, dependent on the soil pH level. pH governs the solubility and hence the availability of nutrients in solution. Ideal soil pH for turfgrass is between 6.5 - 7.5.

SOIL ANALYSIS REPORTS

FROM

GREENWAY TURF SOLUTIONS

REHOBOTH CHRISTIAN COLLEGE

MAIN OVAL, PRIMARY & GYM LAWNS

KENWICK CAMPUS

Prepared By Stephen Jones

WA State Manager – GTS

12-12-2020

MAIN OVAL

Standard Soil Analysis (Mehlich III Extraction)

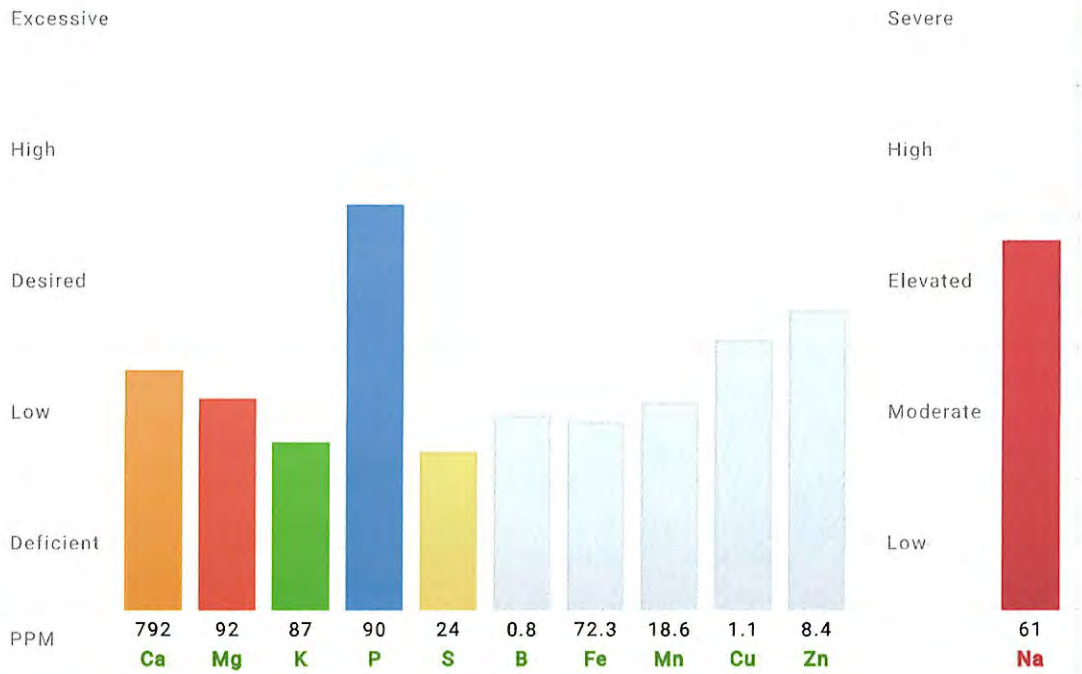
Performed by **The NINEMIRE GROUP**

Client:
Rehoboth Christian College

Field Representative:
Steve Jones

Date of Analysis:
10/12/2020

Soil Nutrient Status



5.5
Total Exchange Capacity

2.5%
Organic Matter (humus)

7.1
pH (H_2O 1:5)

0.08
Conductivity (mmhos/cm)

Base Saturation: Key Elements

	Actuals
Ca	72.7%
Mg	14%
K	4.1%
Na	4.9%
H	0%
Other	4.4%

Actual Saturation

Ideal Saturation

Ideals	
68-72%	Ca
13-16%	Mg
3-5%	K
<3%	Na
4.50%	H
5%	Other

Kg per Ha of Calcium deficient	460
Kg per Ha of Magnesium deficient	57
Kg per Ha of Potassium deficient	139
Kg per Ha of Phosphorus deficient	0

Apply a total of **20.00** Kg per 100m² of Granular Gypsum over an appropriate number of applications

Apply a total of **3.56** Kg per 100m² of Granular Dolomite over an appropriate number of applications

Apply a total of **8.69** Kg per 100m² of GTS 23-2-13 50% XCU over an appropriate number of applications

These numbers are to correct soil deficiencies only. Nutrient losses such as leaching or plant uptake should be considered when formulating maintenance programs. TX Trace may be required to increase levels of iron, manganese, or both. Additional calcium amendments may be required to offset detrimental sodium levels.

Soil Nutrient Analysis Report

Customer	REHOBOTH CHRISTIAN COLLEGE	Report Name	MAIN OVAL
Dominant Species	Couch Grass	Surface Type	Oval
Reporting Date	12/12/2020	Territory Manager	STEPHEN JONES

The Soil Nutrient Analysis has been completed, the results and recommendations based on averages of all samples are as follows;

1. Physical and Chemical Properties

Organic Matter (Humus)

The level of soil organic matter was relatively low in the samples. This could be resulting in nutrient leaching, and reducing the water holding capacity of the soil. To bring the organic matter content to an adequate level the use of organic based fertilisers and amendments is recommended.

Sample Result: 2.5 % **Interpretation:** Low

Soil pH

The average pH level in the samples was adequate. This is a slightly acidic to neutral pH, at this level all nutrients will be available to the plant.

Sample Result: 7.1 pH **Interpretation:** Desirable

Electrical Conductivity (EC)

The average EC reading was low within the samples. A low EC means there is a lack of soluble salts (nutrients) in the profile and could indicate leaching of nutrients.

Sample Result: 0.08 dS/m **Interpretation:** Low

Total Exchange Capacity (TEC)

The TEC level was low in the samples. This could be partly due to the lack of organic matter within the soil profile. To raise the TEC the use of humus based products is recommended, this will increase the amount of colloids available as exchange sites.

Sample Result: 5.5 meq/100mL **Interpretation:** Low

2. Nutrients

Calcium (Ca)

On average calcium (Ca) levels in the samples were in the desired range. A good presence of calcium in the profile will improve soil structure and help to increase porosity and water movement. Calcium will also prevent a build up of undesirable cations such as sodium. Calcium is a vital nutrient in plant cell strength and development, and will increase the plants resistance to pest and disease attack

Sample Result:	72.7 %	**Interpretation:**	Desirable

Magnesium (Mg)

The average magnesium (Mg) levels in the samples were in the desired range. As magnesium is vital for photosynthesis and other functions in the turf plant, it is important to maintain the magnesium level within this desirable range.

Sample Result:	14 %	**Interpretation:**	Desirable

Potassium (K)

On average potassium (K) levels were in the desired range within the samples. It is important to keep potassium at optimum levels within the profile as it is generally required in large amounts by the plant. Potassium is the main nutrient required for stress tolerance, by hardening cell walls it increases resistance to disease and pest attack. Potassium is easily leached from the profile so it is important to maintain yearly applications.

Sample Result:	4.1 %	**Interpretation:**	Desirable

Phosphorus (P)

On average phosphorus (P) levels were low in the samples. Phosphorus is used by the plant in the transfer and storage of energy. It is also required to make vital acids and compounds used for plant growth and root development.

Sample Result:	90 ppm	**Interpretation:**	Low

Sodium (Na)

The average sodium (Na) levels were high within the samples. Sodium is destructive to turf soils, causing poor soil structure, limiting drainage and reducing oxygen levels in the root zone. High sodium is often indicative of poor quality irrigation water. Good calcium and magnesium levels help to reduce sodium in the profile by displacing it on cation exchange sites.

Sample Result:	4.9 %	**Interpretation:**	High

Hydrogen (H)

The proportion of hydrogen (h) in the base saturation percentage is desirable. The level of hydrogen is driven by soil pH, with a lower pH resulting in a higher proportion of hydrogen in relation to other cations. While hydrogen does not necessarily impact on the plant directly, it does occupy valuable exchange sites, reducing the presence of beneficials such as Ca, Mg and K.

Sample Result:	0 %	**Interpretation:**	Desirable

3. Micronutrients

Iron (Fe)

Average iron (Fe) levels within the samples were low. Iron is the key nutrient required for the production of chlorophyll. Low iron could be reducing the plants ability to photosynthesise and exhibiting symptoms of chlorosis (yellowing of foliage). Often iron is high within the soil, but is largely unavailable to the plant due to excessive P levels or high soil pH.

Sample Result:	72.3 ppm	**Interpretation:**	Low

Boron (B)

Average boron (B) levels within the samples were low. Boron is important for plant growth as it is required for cell wall formation within plants. Without Boron, root cell elongation and activity is unable to occur or is limited, affecting plant growth and development.

Sample Result:	0.8 ppm	**Interpretation:**	Low

Sulphur (S)

Average sulphur (S) levels within the samples were at the desirable level. Sulphur is an important nutrient for the amino acids and chlorophyll. Low sulphur levels could be limiting the plants ability to photosynthesise, resulting in a general lack of growth vigour.

Sample Result:	24 ppm	**Interpretation:**	Desirable

Manganese (Mn)

Average manganese (Mn) levels within the samples were low. Like iron, manganese is used by the plant to produce chlorophyll. Low levels can result in a general lack in vigour due to the plants inability to effectively generate energy.

Sample Result:	18.6 ppm	**Interpretation:**	Low

Copper (Cu)

Average copper (Cu) levels within the samples were in the desirable range. Like zinc, copper is required by the plant in small quantities to form certain hormones and enzymes. Low copper levels can result in a lack of new growth and the dying off of new tillers.

Sample Result:	1.1 ppm	**Interpretation:**	Desirable

Zinc (Zn)

Zinc (Zn) levels within the samples were in the desired range. Zinc is required by turf grass in small quantities for the development of certain growth hormones.

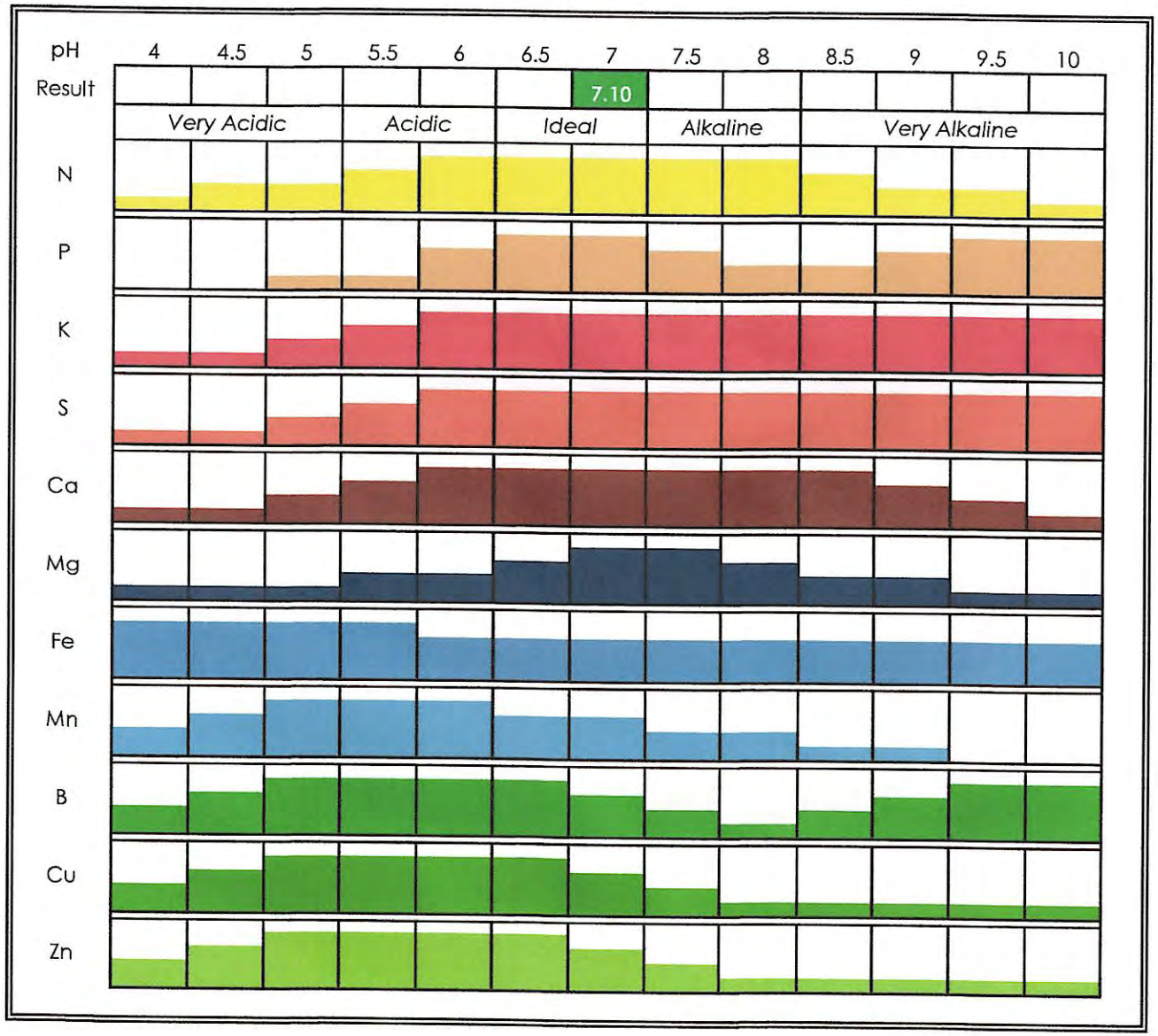
Sample Result:	8.4 ppm	**Interpretation:**	Desirable

4. Nutrient Availability as Influenced by Soil pH

Sample ID:	MAIN OVAL

Date:	12-Dec-20

Sample Result (H_20 1:5): 7.10



This chart indicates the availability of different nutrients to the plant, dependent on the soil pH level. pH governs the solubility and hence the availability of nutrients in solution. Ideal soil pH for turfgrass is between 6.5 - 7.5.

PRIMARY LAWN

Standard Soil Analysis (Mehlich III Extraction)

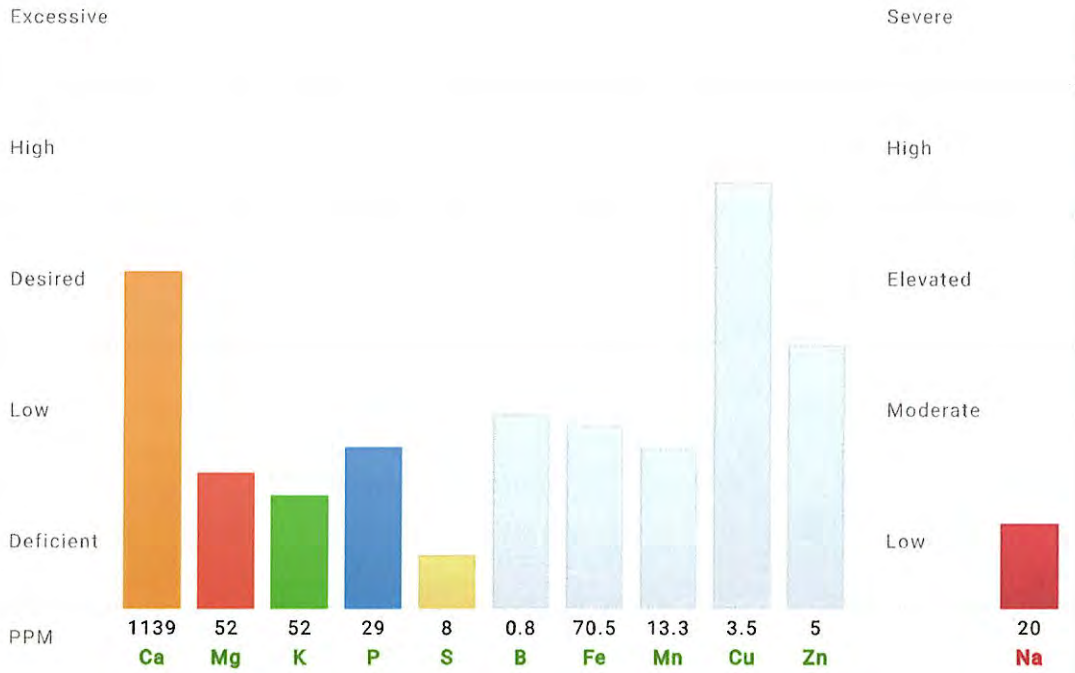
Performed by **The NINEMIRE GROUP**

Client:
Rehoboth Christian College

Field Representative:
Steve Jones

Date of Analysis:
10/12/2020

Soil Nutrient Status



6.6
Total Exchange Capacity

1.9%
Organic Matter (humus)

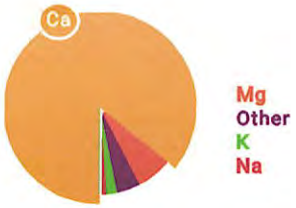
8
pH (H_2O 1:5)

0.05
Conductivity (mmhos/cm)

Base Saturation: Key Elements

	Actuals
Ca	85.8%
Mg	6.6%
K	2%
Na	1.3%
H	0%
Other	4.4%

Actual Saturation



Ideal Saturation

Ideals	
68-72%	Ca
13-16%	Mg
3-5%	K
<3%	Na
4.50%	H
5%	Other

Kg per Ha of Calcium deficient	0
Kg per Ha of Magnesium deficient	116
Kg per Ha of Potassium deficient	191
Kg per Ha of Phosphorus deficient	46

Apply a total of **7.25** Kg per 100m² of Granular Dolomite over an appropriate number of applications

Apply a total of **11.94** Kg per 100m² of GTS 23-2-13 50% XCU over an appropriate number of applications

Apply a total of **4.60** Kg per 100m² of GTS 23-2-13 50% XCU over an appropriate number of applications

These numbers are to correct soil deficiencies only. Nutrient losses such as leaching or plant uptake should be considered when formulating maintenance programs. TX Trace may be required to increase levels of iron, manganese, or both.

Soil Nutrient Analysis Report

Customer	REHOBOTH CHRISTIAN COLLEGE	Report Name	PRIMARY LAWN
Dominant Species	Kikuyu	Surface Type	Lawn
Reporting Date	12/12/2020	Territory Manager	STEPHEN JONES

The Soil Nutrient Analysis has been completed, the results and recommendations based on averages of all samples are as follows;

1. Physical and Chemical Properties

Organic Matter (Humus)

The level of soil organic matter was relatively low in the samples. This could be resulting in nutrient leaching, and reducing the water holding capacity of the soil. To bring the organic matter content to an adequate level the use of organic based fertilisers and amendments is recommended.

Sample Result: 1.9 % **Interpretation:** Low

Soil pH

The average pH level in the samples was extremely high. This is an alkaline pH, at this level soil structure will be directly affected and many nutrients such as Fe, Mn, B, Cu, Zn and P will be unavailable to the plant. To lower pH to the optimum level applications of sulphur based products should be used.

Sample Result: 8 pH **Interpretation:** Very High

Electrical Conductivity (EC)

The average EC reading was low within the samples. A low EC means there is a lack of soluble salts (nutrients) in the profile and could indicate leaching of nutrients.

Sample Result: 0.05 dS/m **Interpretation:** Low

Total Exchange Capacity (TEC)

The TEC level was adequate in the samples. This indicates that nutrients are available to the plant in the root zone. To maintain the TEC at this level continue to use humus based products regularly throughout the year.

Sample Result: 6.6 meq/100mL **Interpretation:** Desirable

2. Nutrients

Calcium (Ca)

On average calcium (Ca) levels in the samples were high. Calcium is a dominant cation and high levels can prevent other nutrients such as magnesium from occupying exchange sites in the profile. It is important to maintain a balanced Ca - Mg ratio of about 75 : 15 to ensure optimum soil structure and plant health.

Sample Result:	85.8 %	**Interpretation:**	High

Magnesium (Mg)

The average magnesium (Mg) levels were very low within the samples. Magnesium is a cation that is vital for the plant to photosynthesise, and is (along with calcium) an important component of a good soil structure. It is likely that the turf plant is suffering from the lack of magnesium. Low magnesium can allow for the build up of undesirable cations such as sodium.

Sample Result:	6.6 %	**Interpretation:**	Very Low

Potassium (K)

On average potassium (K) levels were low within the samples. It is important to keep potassium at optimum levels within the profile as it is generally required in large amounts by the plant (second to nitrogen). Potassium is the main nutrient required for stress tolerance, by hardening cell walls it increases resistance to disease and pest attack. Potassium is easily leached from the profile so it is important to maintain yearly applications

Sample Result:	2 %	**Interpretation:**	Low

Phosphorus (P)

On average phosphorus (P) levels were low in the samples. Phosphorus is used by the plant in the transfer and storage of energy. It is also required to make vital acids and compounds used for plant growth and root development.

Sample Result:	29 ppm	**Interpretation:**	Low

Sodium (Na)

The average sodium (Na) levels were adequate within the samples. Sodium is destructive to turf soils, causing poor soil structure, limiting drainage and reducing oxygen levels in the root zone. Good calcium and magnesium levels help to reduce sodium in the profile by displacing it on cation exchange sites.

Sample Result:	1.3 %	**Interpretation:**	Desirable

Hydrogen (H)

The proportion of hydrogen (h) in the base saturation percentage is desirable. The level of hydrogen is driven by soil pH, with a lower pH resulting in a higher proportion of hydrogen in relation to other cations. While hydrogen does not necessarily impact on the plant directly, it does occupy valuable exchange sites, reducing the presence of beneficials such as Ca, Mg and K.

Sample Result:	0 %	**Interpretation:**	Desirable

3. Micronutrients

Iron (Fe)

Average iron (Fe) levels within the samples were low. Iron is the key nutrient required for the production of chlorophyll. Low iron could be reducing the plants ability to photosynthesise and exhibiting symptoms of chlorosis (yellowing of foliage). Often iron is high within the soil, but is largely unavailable to the plant due to excessive P levels or high soil pH.

Sample Result:	70.5 ppm	**Interpretation:**	Low

Boron (B)

Average boron (B) levels within the samples were low. Boron is important for plant growth as it is required for cell wall formation within plants. Without Boron, root cell elongation and activity is unable to occur or is limited, affecting plant growth and development.

Sample Result:	0.8 ppm	**Interpretation:**	Low

Sulphur (S)

Average sulphur (S) levels within the samples were low. Sulphur is an important nutrient for the amino acids and chlorophyll. Low sulphur levels could be limiting the plants ability to photosynthesise, resulting in a general lack of growth vigour.

Sample Result:	8 ppm	**Interpretation:**	Low

Manganese (Mn)

Average manganese (Mn) levels within the samples were low. Like iron, manganese is used by the plant to produce chlorophyll. Low levels can result in a general lack in vigour due to the plants inability to effectively generate energy.

Sample Result:	13.3 ppm	**Interpretation:**	Low

Copper (Cu)

Average copper (Cu) levels within the samples were high. Like zinc, copper is required by the plant in small quantities to form certain hormones and enzymes. In high quantities copper can be toxic to turf grass.

Sample Result:	3.5 ppm	**Interpretation:**	High

Zinc (Zn)

Zinc (Zn) levels within the samples were low. Zinc is required by turf grass in small quantities for the development of certain growth hormones.

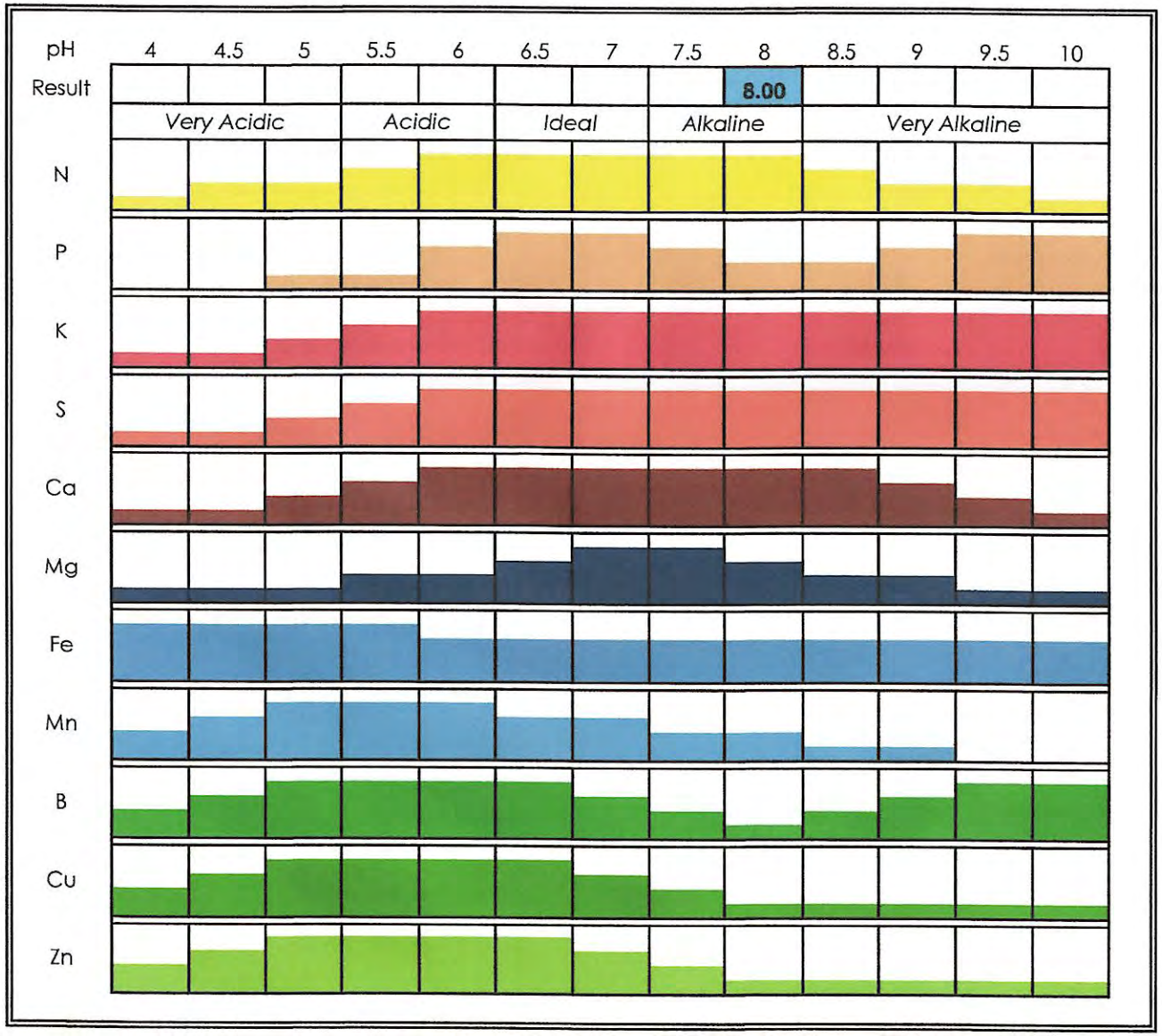
Sample Result:	5 ppm	**Interpretation:**	Low

4. Nutrient Availability as Influenced by Soil pH

Sample ID:	PRIMARY LAWN

Date:	12-Dec-20

Sample Result (H_2O 1:5): 8.00



This chart indicates the availability of different nutrients to the plant, dependent on the soil pH level. pH governs the solubility and hence the availability of nutrients in solution. Ideal soil pH for turfgrass is between 6.5 - 7.5.

GYM LAWN

Standard Soil Analysis (Mehlich III Extraction)

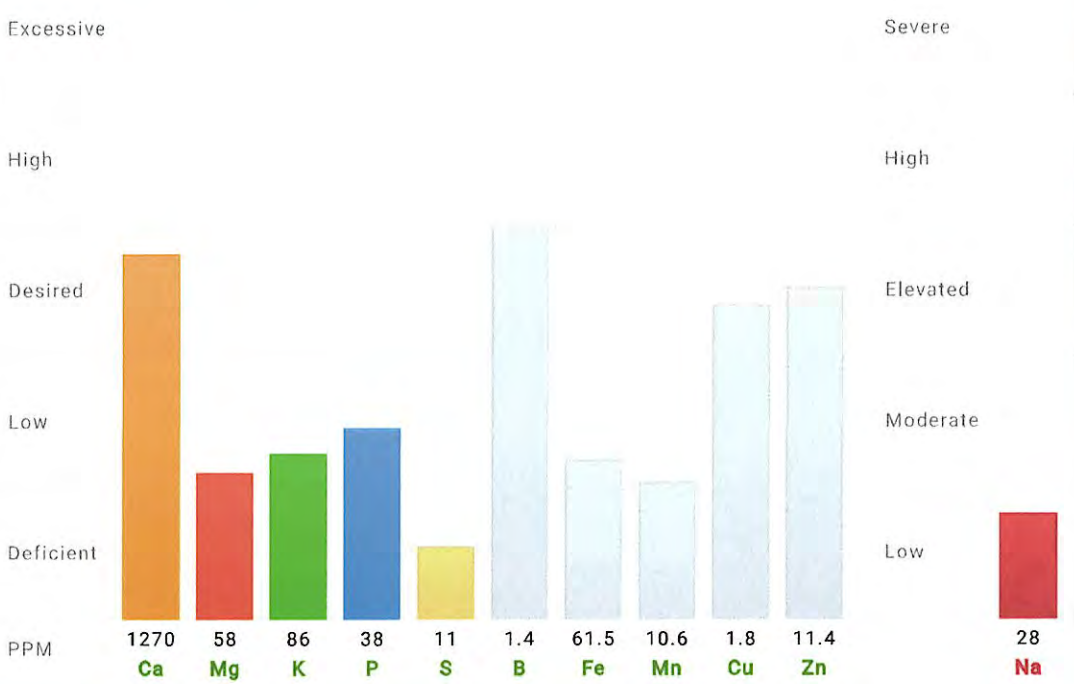
Performed by **The NINEMIRE GROUP**

Client:
Rehoboth Christian College

Field Representative:
Steve Jones

Date of Analysis:
10/12/2020

Soil Nutrient Status



7.5
Total Exchange Capacity

2.5%
Organic Matter (humus)

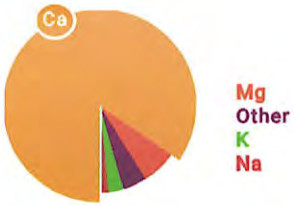
7.9
pH (H_2O 1:5)

0.08
Conductivity (mmhos/cm)

Base Saturation: Key Elements

	Actuals
Ca	84.6%
Mg	6.5%
K	2.9%
Na	1.6%
H	0%
Other	4.4%

Actual Saturation



Ideal Saturation

Ideals	
68-72%	Ca
13-16%	Mg
3-5%	K
<3%	Na
4.50%	H
5%	Other

Kg per Ha of Calcium deficient	0
Kg per Ha of Magnesium deficient	108
Kg per Ha of Potassium deficient	140
Kg per Ha of Phosphorus deficient	33

Apply a total of **6.75** Kg per 100m² of Granular Dolomite over an appropriate number of applications

Apply a total of **8.75** Kg per 100m² of GTS 23-2-13 50% XCU over an appropriate number of applications

Apply a total of **3.30** Kg per 100m² of GTS 23-2-13 50% XCU over an appropriate number of applications

These numbers are to correct soil deficiencies only. Nutrient losses such as leaching or plant uptake should be considered when formulating maintenance programs. TX Trace may be required to increase levels of iron, manganese, or both.

Soil Nutrient Analysis Report

Customer	REHOBOTH CHRISTIAN COLLEGE	Report Name	GYM LAWN
Dominant Species	Kikuyu	Surface Type	Lawn
Reporting Date	12/12/2020	Territory Manager	STEPHEN JONES

The Soil Nutrient Analysis has been completed, the results and recommendations based on averages of all samples are as follows;

1. Physical and Chemical Properties

Organic Matter (Humus)

The level of soil organic matter was relatively low in the samples. This could be resulting in nutrient leaching, and reducing the water holding capacity of the soil. To bring the organic matter content to an adequate level the use of organic based fertilisers and amendments is recommended.

Sample Result: 2.5 % **Interpretation:** Low

Soil pH

The average pH level in the samples was high. This is a neutral to slightly alkaline pH, at this level nutrients such as Fe, Mn, B, Cu, ZN and P start to become unavailable. To lower the pH to the optimum level, applications of sulphur based products can be carried out.

Sample Result: 7.9 pH **Interpretation:** High

Electrical Conductivity (EC)

The average EC reading was low within the samples. A low EC means there is a lack of soluble salts (nutrients) in the profile and could indicate leaching of nutrients.

Sample Result: 0.08 dS/m **Interpretation:** Low

Total Exchange Capacity (TEC)

The TEC level was adequate in the samples. This indicates that nutrients are available to the plant in the root zone. To maintain the TEC at this level continue to use humus based products regularly throughout the year.

Sample Result: 7.5 meq/100mL **Interpretation:** Desirable

2. Nutrients

Calcium (Ca)

On average calcium (Ca) levels in the samples were high. Calcium is a dominant cation and high levels can prevent other nutrients such as magnesium from occupying exchange sites in the profile. It is important to maintain a balanced Ca - Mg ratio of about 75 : 15 to ensure optimum soil structure and plant health.

Sample Result:	84.6 %	**Interpretation:**	High

Magnesium (Mg)

The average magnesium (Mg) levels were very low within the samples. Magnesium is a cation that is vital for the plant to photosynthesise, and is (along with calcium) an important component of a good soil structure. It is likely that the turf plant is suffering from the lack of magnesium. Low magnesium can allow for the build up of undesirable cations such as sodium.

Sample Result:	6.5 %	**Interpretation:**	Very Low

Potassium (K)

On average potassium (K) levels were low within the samples. It is important to keep potassium at optimum levels within the profile as it is generally required in large amounts by the plant (second to nitrogen). Potassium is the main nutrient required for stress tolerance, by hardening cell walls it increases resistance to disease and pest attack. Potassium is easily leached from the profile so it is important to maintain yearly applications

Sample Result:	2.9 %	**Interpretation:**	Low

Phosphorus (P)

On average phosphorus (P) levels were low in the samples. Phosphorus is used by the plant in the transfer and storage of energy. It is also required to make vital acids and compounds used for plant growth and root development.

Sample Result:	38 ppm	**Interpretation:**	Low

Sodium (Na)

The average sodium (Na) levels were adequate within the samples. Sodium is destructive to turf soils, causing poor soil structure, limiting drainage and reducing oxygen levels in the root zone. Good calcium and magnesium levels help to reduce sodium in the profile by displacing it on cation exchange sites.

Sample Result:	1.6 %	**Interpretation:**	Desirable

Hydrogen (H)

The proportion of hydrogen (h) in the base saturation percentage is desirable. The level of hydrogen is driven by soil pH, with a lower pH resulting in a higher proportion of hydrogen in relation to other cations. While hydrogen does not necessarily impact on the plant directly, it does occupy valuable exchange sites, reducing the presence of beneficials such as Ca, Mg and K.

Sample Result:	0 %	**Interpretation:**	Desirable

3. Micronutrients

Iron (Fe)

Average iron (Fe) levels within the samples were low. Iron is the key nutrient required for the production of chlorophyll. Low iron could be reducing the plants ability to photosynthesise and exhibiting symptoms of chlorosis (yellowing of foliage). Often iron is high within the soil, but is largely unavailable to the plant due to excessive P levels or high soil pH.

Sample Result:	61.5 ppm	**Interpretation:**	Low

Boron (B)

Average boron (B) levels within the samples were within the desirable range. Boron is important for plant growth as it is required for cell wall formation within plants. Without Boron, root cell elongation and activity is unable to occur or is limited, affecting plant growth and development.

Sample Result:	1.4 ppm	**Interpretation:**	Desirable

Sulphur (S)

Average sulphur (S) levels within the samples were low. Sulphur is an important nutrient for the amino acids and chlorophyll. Low sulphur levels could be limiting the plants ability to photosynthesise, resulting in a general lack of growth vigour.

Sample Result:	11 ppm	**Interpretation:**	Low

Manganese (Mn)

Average manganese (Mn) levels within the samples were low. Like iron, manganese is used by the plant to produce chlorophyll. Low levels can result in a general lack in vigour due to the plants inability to effectively generate energy.

Sample Result:	10.6 ppm	**Interpretation:**	Low

Copper (Cu)

Average copper (Cu) levels within the samples were in the desirable range. Like zinc, copper is required by the plant in small quantities to form certain hormones and enzymes. Low copper levels can result in a lack of new growth and the dying off of new tillers.

Sample Result:	1.8 ppm	**Interpretation:**	Desirable

Zinc (Zn)

Zinc (Zn) levels within the samples were in the desired range. Zinc is required by turf grass in small quantities for the development of certain growth hormones.

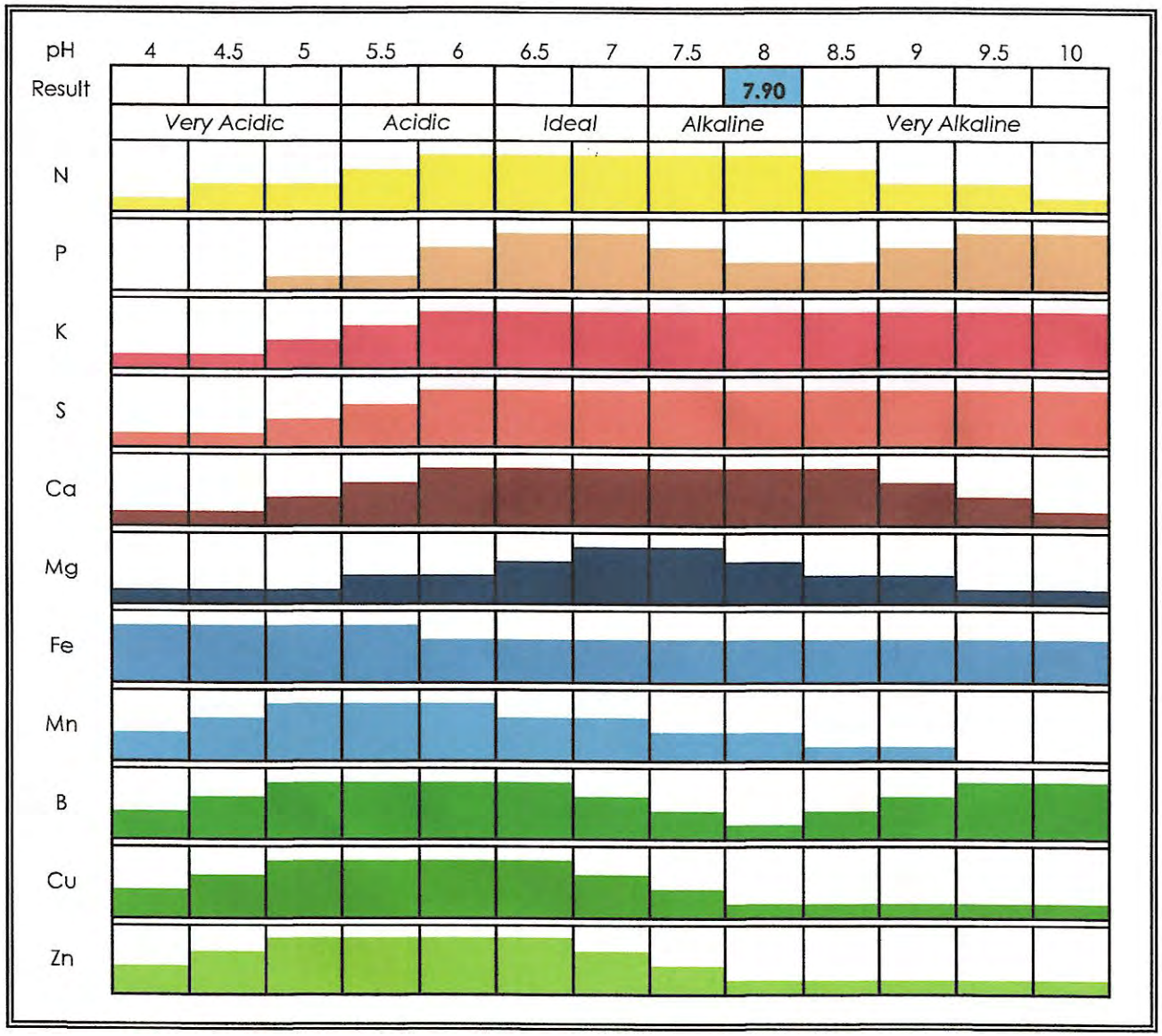
Sample Result:	11.4 ppm	**Interpretation:**	Desirable

4. Nutrient Availability as Influenced by Soil pH

Sample ID:	GYM LAWN

Date:	12-Dec-20

Sample Result (H_2O 1:5): 7.90



This chart indicates the availability of different nutrients to the plant, dependent on the soil pH level. pH governs the solubility and hence the availability of nutrients in solution. Ideal soil pH for turfgrass is between 6.5 - 7.5.