



Pilot Project Report



SH16 Causeway Upgrade

Version 1.5

PREPARED FOR
NZTA

DATE
February 19, 2014



CONTENTS

About the Assessment	1
Project Description	1
Purpose and Scope	1
Project References	2
Score Summary	3
Category Summary	4
Project Requirements	4
Environment & Water	5
Access & Equity	5
Construction Activities	5
Materials & Resources	5
Pavement Technologies	5
Custom Credits	6
Discussion	7
How This Project Compares	7
Conclusions & Recommendations	8
Recommendations for Future Projects	8
Limitations of Assessment	9

ABOUT THE ASSESSMENT

Greenroads Foundation spoke with authorized representatives New Zealand Transport Agency (NZTA) and the Causeway Alliance on several occasions to discuss the SH16 Causeway Upgrade Project for purposes of this Greenroads Pilot Project Assessment. The goal of the assessment is to determine the potential Greenroads Rating for the SH16 Causeway Upgrade project located in Auckland, New Zealand. The SH16 Causeway Upgrade Pilot Project is the fourth of several assessments included in the NZTA Greenroads Pilot Program.

This Detailed Pilot Project Assessment summarizes our understanding of the Project, the potential Greenroads Rating, and our recommendations to the Project Team. More information on the process of Project Rating and eligibility is available in the *Greenroads Project Handbook* (greenroads.org/files/244.pdf).

As a Pilot Project, our findings in this report are based upon our understanding of the overall intent of both the design and construction practices identified during interviews with the project team and a tour of the project. The results of the Pilot Assessment are based on the *Greenroads Manual v1.5* (www.greenroads.org/manual).

A brief description of the Greenroads Rating System is provided in Appendix A, the evaluation method used in this Assessment is attached in Appendix B, and the completed and annotated Greenroads Scorecards for SH16 Causeway Upgrade are located in Appendix C.

PROJECT DESCRIPTION

The SH16 Causeway Upgrade Project is located in Auckland, New Zealand, as part of the Auckland-Kumeu Highway. The highway runs beside the Motu Manawa – Pollen Island Marine Reserve and the Causeway Alliance is ensuring that the project will have as little impact as possible on the reserve.

The project will raise the roadway surface 1.5 meters to prevent flooding and debris and widen the roadway to provide additional capacity in both directions. Also, 4.5 km of the road will be improved between the Great North Road Interchange and Te Atatu Interchange. Both a shared-use path that runs the length of the roadway and stormwater treatment facilities will be improved. Construction started in March 2013 and is scheduled to be completed in 2017. The project is estimated to cost \$220 million NZD and is being constructed by the Causeway Alliance, which is made up of AECOM, Coffey, Fulton Hogan, Leighton Contractors, Sinclair Knight Merz and the NZ Transport Agency.

PURPOSE AND SCOPE

The scope of the Pilot Project Assessment (<https://www.greenroads.org/1368/pilot-project.html>) includes collection and a brief review of a listed Standard Project Documents (SPDs) and typical design reports that are commonly prepared for most roadway projects. Greenroads also conducts at least one interview with representatives of the Project Team and any necessary follow up discussions.

The specific objectives of this Detailed Pilot Project Assessment are to:

1. Understand the general intentions of the Project Team at NZTA.
2. Identify areas where the Project may achieve points based on Standard Project Documentation.
3. Identify other potential areas where the Project may achieve points.
4. Identify potential new ideas that can be considered as Custom Credits.

Using the information provided, a Greenroads Scorecard is completed for the Project that reflects the general state of the Project as well as its potential for Certification.

PROJECT REFERENCES

This Assessment was based on a phone call with Kevin Stevens of the Causeway Alliance, other discussions with the Project Team, an in-person visit by Jeralee Anderson, and a brief review of the following Project documents:

- Archaeological Site Management Plan (ASMP) – Revision A, dated February 2013.
- Construction Air Quality Management Plan (CAQMP), dated February 2013.
- Construction Environmental Management Plan (CEMP) – Revision C, dated February 2013.
- Construction Erosion & Sediment Control Plan (CESC) – Revision B, dated February 2013.
- Construction Noise and Vibration Management Plan (CNVMP) – Revision C, dated February 2013.
- Contaminated Soils Management Plan (CSMP) – Revision B, dated February 2013.
- Hazardous Substances Management Plan (HSMP) – Revision A, dated February 2013.
- Lizard Management Plan – Revision A, dated December 10, 2012.
- Mimulus Management Plan – Revision B, dated March 2013.
- Urban Design and Landscape Management Plan – Revision C, dated October 31, 2013.
- Waste Management Plan – Revision A, dated March 2013.
- <http://www.nzta.govt.nz/projects/sh16causeway/>

SCORE SUMMARY

A Greenroads Scorecard is attached in Appendix C that reflects our understanding of the Project intent and potential achievement level in Greenroads. A minimum of 32 points is required for Certification.



Figure 1. SH16 Causeway Upgrade Summary Scorecard.

The highlights of the Summary Scorecard (Figure 1) are summarized below:

- The project has demonstrated intent to meet **10 of the 11 Project Requirements**.
- A total of **7 points do not appear to be practical** for SH16 Causeway Upgrade to achieve due to the nature of the Project and would probably be considered inappropriate design choices.
- SH16 Causeway Upgrade has demonstrated intent to meet **19 Voluntary Credits totaling 42 points**. This number of points does not meet the minimum requirements for a Certification award.
- **Two credits were identified as economical opportunities to earn up to 3 additional points**. These credits are potentially feasible based on the documents provided and Greenroads believes may be possible to implement with minimal to no additional construction cost, or may required minimal design team effort or time. These credits are marked in **boldface orange** in the Scorecard in Appendix C. A few of these activities may actually been performed on the Project, but this was not clear in the documents reviewed for this report.
- **Twenty credits were identified as opportunities for SH16 Causeway Upgrade to earn an additional 56 points**. Because the Project is already in construction, it is possible that some of these activities are already being pursued at this time. This may also mean that some of these credits are no longer possible without increasing construction costs or requiring significant scope changes. However, Greenroads believes they are within the realm of potential activities for projects like SH16 Causeway Upgrade. Earlier consideration of these activities during planning and design may make them more economical considerations.
- **No Custom Credits were identified for this project**.

CATEGORY SUMMARY

Figure 2 shows a summary of where points may be achieved with the current intent that has been shown and where economical additions may be made. This does not represent all credits which could be achieved on the project, but rather the credits that may not add significantly to the project cost or do not drastically change the scope of the project.

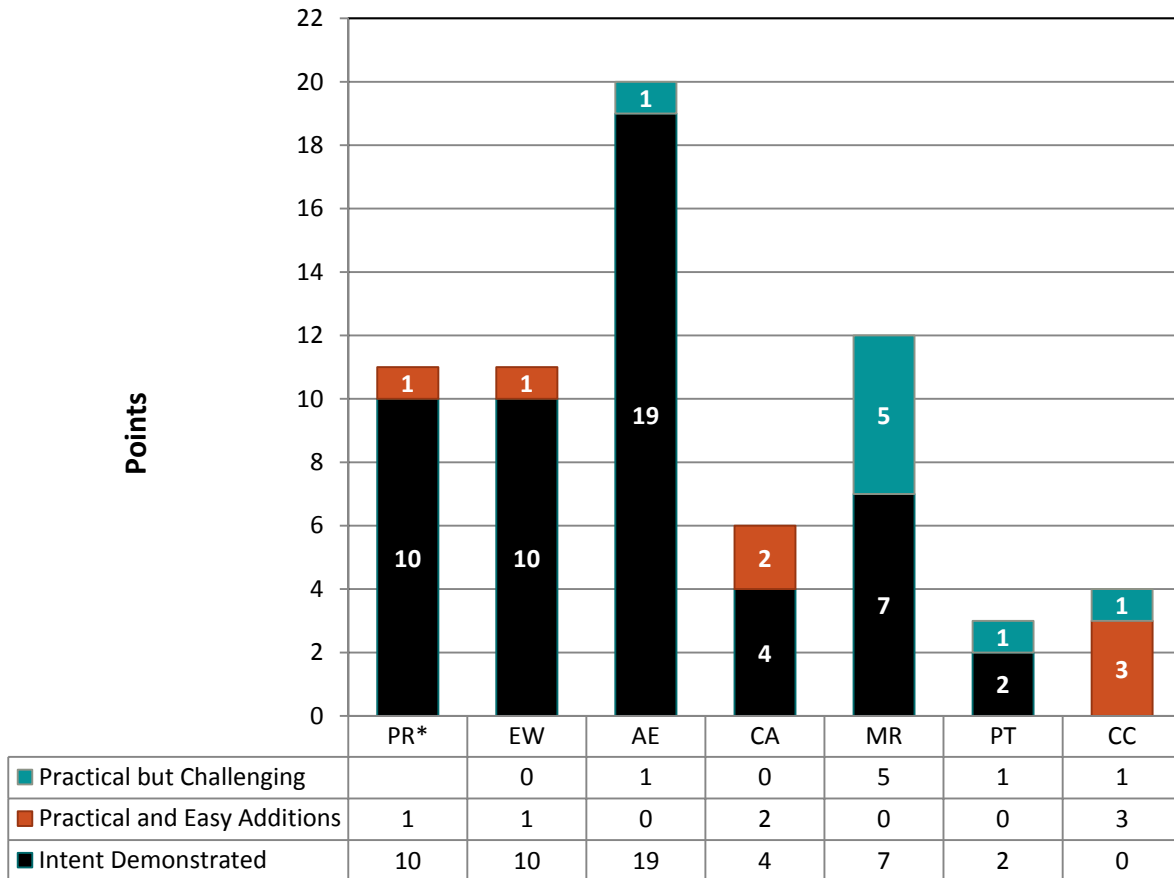


Figure 2. SH16 Causeway Upgrade Project

PROJECT REQUIREMENTS

The SH16 Causeway Upgrade project appears to intend to meet 10 of the 11 Project Requirements.

- Specific credit documentation was not provided for review in this Assessment. For Certification, each of the 11 PR items would need to be documented completely in order to qualify for Certification Award.
- A Lifecycle Inventory has not been completed. The Project Team would need to ensure that that this Project Requirement is completed for Certification.

ENVIRONMENT & WATER

The SH16 Causeway Upgrade project demonstrated intent to earn 10 of a total 21 possible in the EW Category.

- It appears that the drainage credits may be achieved, but it could not be determined to what extent from the provided documentation. Calculations would need to be provided.
- The Project Team has indicated that only non-invasive and native plants will be used and that there will not be any permanent irrigation.
- Stormwater cost analyses should be considered as an easy option for an additional point.
- The Urban Design and Landscape Master Plan states that full cut-off lighting will be used and that light should not leave the site boundaries.

ACCESS & EQUITY

The SH16 Causeway Upgrade project demonstrated intent to earn 19 of a total 30 possible in the AE Category.

- The Project Team stated that 3rd party safety audits are completed every 3 months.
- The facility expansion appears to be able to earn points for Context Sensitive Solutions, Pedestrian Access, Bicycle Access, and Transit & HOV Access.
- The Project Team has stated that the value of artwork on the Project will likely be between \$100,000 and \$200,000. This expense may not be adequate to achieve the full 2 points, but there will also be signage and sculptures along the multi-use path related to local lwi sites.

CONSTRUCTION ACTIVITIES

The SH16 Causeway Upgrade demonstrated intent to earn 4 of a total 14 possible in the CA Category.

- The Project Team has stated that the Causeway Alliance has ISO 9001 Certification.
- The Project Team has indicated that Environmental Training will be completed.
- The submitted Waste Management Plan included many items that will be recycled on the project. The final plan will need to be submitted with quantities of materials and cost of recycling for Certification.
- Water Use Tracking should be considered as an easy option for the Project to earn points.

MATERIALS & RESOURCES

The SH16 Causeway Upgrade project demonstrated intent to earn 7 of a total 23 possible in the MR Category.

- It could not be determined if Pavement Reuse could be achieved on the Project. The roadway is being raised 1.5 meters but the existing pavement could be reused on the Project.
- It is possible that many materials will already be sourced locally, but it could not be determined with the provided documentation. Additional calculations are required.
- The Project Team indicated that many of the project materials should be sourced locally. Two points have been shown on the scorecard but more could be earned.
- The Project Team stated that LED lighting will be used on the Project.

PAVEMENT TECHNOLOGIES

The SH16 Causeway Upgrade project demonstrated intent to earn 2 of a total 20 possible in the PT Category.

- The Project Team has stated that an open graded surface course is being used for Quiet Pavement. Noise test results and a map showing quiet pavement areas would need to be submitted for Certification.

CUSTOM CREDITS

No Custom Credits were identified for the SH16 Causeway Upgrade project. Several Custom Credits have been recently developed that may or may not be appropriate for this Project.

Some Custom Credits that may be applicable for this Project, or future similar projects, are:

- Freight Access
- Pavement Smoothness
- Roadside Revegetation
- Sustainable Transportation Professional (STP)
- Alternative Energy
- Low Emitting Materials
- Workzone Safety

DISCUSSION

Based on our understanding of the intent of the Project Team, it appears that a Greenroads rating for this project may be achieved with minimal additional effort by the project team. A **Bronze Rating** could be within reach, but is likely to be somewhat challenging since credit specific documents were not reviewed.

To achieve a Certification award, all activities must be formally documented according to the current version of the *Greenroads Manual*. Importantly, all of the Project Requirements must be completed and documented. Due to the current stage of the Project, it may be difficult to pursue further recognition. **At this time, Greenroads believes Certification could be successfully achieved for the SH16 Causeway Upgrade project.**

HOW THIS PROJECT COMPARES

The SH16 Causeway Upgrade project scores above average compared to other typical highway projects. Generally, most projects complete between 4-7 Project Requirements and earn between 15-25 points in Voluntary Credits. These statistics are based on a sample of about 120 projects from across the U.S. and Canada that use current best practices and design standards and were built within the last 10 years. Table 1 shows how Your Project compares to other projects within this sample set based on some of the descriptive characteristics of the project.

Table 1. Project's Rating Position Compared to Other Projects

Your Project		Score (w/o CC)	Rating	
SH16 Causeway Upgrade		42	Bronze	
Your Project's Reasonable Potential				
SH16 Causeway Upgrade		45	Silver	
	No. Projects	Score (w/o CC)	Rating	Rating Range
<i>US Projects</i>	120	25 ± 1	None	None
<i>US Projects Reasonable Potential</i>	120	59 ± 17	Gold	Bronze – Evergreen
<i>Greenroads Projects Certified to Date</i>	9	39 ± 5	Bronze	Bronze – Silver
<i>DBB Projects</i>	98	25 ± 1	None	None
<i>Alternative Delivery Projects</i>	22	31 ± 2	None	None – Bronze
<i>Urban Projects</i>	40	28 ± 1	None	None
<i>Projects with Budgets >\$100 mil</i>	18	32 ± 2	Bronze	None – Bronze
<i>Projects with Sustainability Emphasis</i>	37	29 ± 1	None	None

CONCLUSIONS & RECOMMENDATIONS

The results of this Detailed Pilot Project have provided valuable information on how Greenroads may be applied to New Zealand roadway design and construction projects. No further adaptation needs were noted beyond those previously discussed in the Pilot Project Report for the Buckle Street Underpass in Wellington, New Zealand. Additionally, recommendations for the SH16 Causeway Upgrade Project are similar. The following section includes the recommendations for the benefit of the Project Team.

RECOMMENDATIONS FOR FUTURE PROJECTS

There are numerous design opportunities that should be considered throughout design and construction decision-making that may be helpful in positioning future projects for successful Certification that are similar in size, purpose and nature to SH16 Causeway Upgrade.

For this Project and most projects, additional sustainability opportunities appear to be available in the areas of increased environmental stewardship during design and more accountability for materials management throughout construction.

Below are some specific recommendations for the Project Team:

1. As with many Greenroads Pilot Projects, we recommend that the 11 Greenroads Project Requirements are addressed early in project planning and design, especially if Certification is a project goal. Incorporating Project Requirements PR-4 through PR-7 into the specifications and technical drawings is an excellent way to ensure that they will be completed during construction.
2. Often the greatest potential to earn points involves considering stormwater management beyond completion of construction (during the operations phase of the facility). For this project, there was not enough information to determine to what extent these activities might be done but it does appear that stormwater management will be done. In particular, credit calculations are not reviewed for Pilot Project Assessments. Generally, the Environment & Water category offers a huge potential for reducing environmental impacts over the life of roadway projects.
3. Materials tracking and management often provides great opportunities for innovation and cost savings, especially with increased use of recycled materials, reuse of existing site materials, and creative waste management activities. This project appears to be doing some of these practices, but the extent of these activities could not be determined without additional documentation.
4. This Project did not identify any Custom Credits. A sample of Custom Credit ideas on record (currently 9 total) with Greenroads are listed in the latest version of the Errata for the Greenroads Manual and on the Greenroads website. Several Custom Credits such as Sustainable Transportation Professional (STP), Roadside Revegetation, and Freight Access look to be most applicable to projects like this one.

LIMITATIONS OF ASSESSMENT

- Documents provided were not reviewed for detailed compliance with specifications in the *Greenroads Manual*.
- The results and recommendations provided in this study are only applicable to the version of the Rating System used to complete this assessment: *Greenroads Manual v1.5* (dated February 4, 2011).
- The reported score is not intended to be interpreted as an actual earned Rating, completed Certification review, or Registration of this project. Rather, the score reflects the current potential score of the Project based on the documents provided for our review and verbal conversation with the Project Manager and other representatives of the Project Team. Successful completion of a Pilot Project Assessment does not indicate that the Project is Certified.
- The completed Scorecard is intended to serve as guidance and as a learning tool for the Project Team and may be publicized in accordance with the Greenroads Trademark & Copyright Policy as a “Pilot Project.” However, under no circumstances shall any Project Team member claim that this project has been certified by Greenroads Foundation as a result of this Assessment.
- Greenroads respects reasonable requests for confidentiality, and reserves the right to publish, distribute or otherwise use such confidential project data to assess the Project in aggregate with other projects, without exposing any distinguishing information about the Project’s identity. This means the Project information used for or created as a result of this Assessment may be used for internal business development and/or quality control purposes.

APPENDIX A

About the Greenroads Rating Program



BACKGROUND

The Greenroads® Rating System is a collection of sustainability best practices, called “credits,” that apply to roadway design and construction, much like the Leadership in Energy and Environmental Design (LEED®) Rating Systems for green buildings. Completing these activities can earn points toward a total score, called a “Rating,” that can be used as an indicator of the overall sustainability of the project.

A **Greenroad** is defined as roadway project that has been designed and constructed to a level of sustainability that is substantially higher than current common practice.

The Greenroads Project Rating Program is one of three charitable programs for transportation infrastructure administered by the 501(c)(3) non-profit organization, Greenroads Foundation. The Project Rating Program includes two core services for projects to get a Greenroads Rating: Project Certification and Project Assessment.

Certification is a rigorous, independent, third-party review of project documentation according to the standard in the most current *Greenroads Manual*. The Certification process is intended to be somewhat challenging in order to recognize projects that go far beyond the conventional practice for sustainable design and construction. Projects that successfully complete the Certification process are eligible for Certification Award and recognition as a “Greenroad.”

Greenroads Assessments are less stringent and shorter turnaround: they rely on standard project documentation at-hand and are used most often as stepping stones on the path to certify a project in the future. Assessments are also used for completed projects as a benchmarking tool and for all projects located outside of the United States as part of Greenroads Pilot Program efforts.

Since 2007, Greenroads has been tested on over 125 design and construction projects around the world of various types, shapes, sizes and stages of design and construction. Projects from all over the United States and internationally are participating in the Greenroads Project Rating Program and joining the Foundation in its efforts toward making our transportation infrastructure more sustainable.

RATING SYSTEM DETAILS

Greenroads sustainability credits are divided into two types: mandatory and voluntary. Projects pursuing Certification must complete 11 mandatory credits (Project Requirements) in order to qualify for a Certification Award. There are 37 other Voluntary Credits that when complete, earn points toward one of four Certification Awards: Bronze, Silver, Gold and Evergreen.



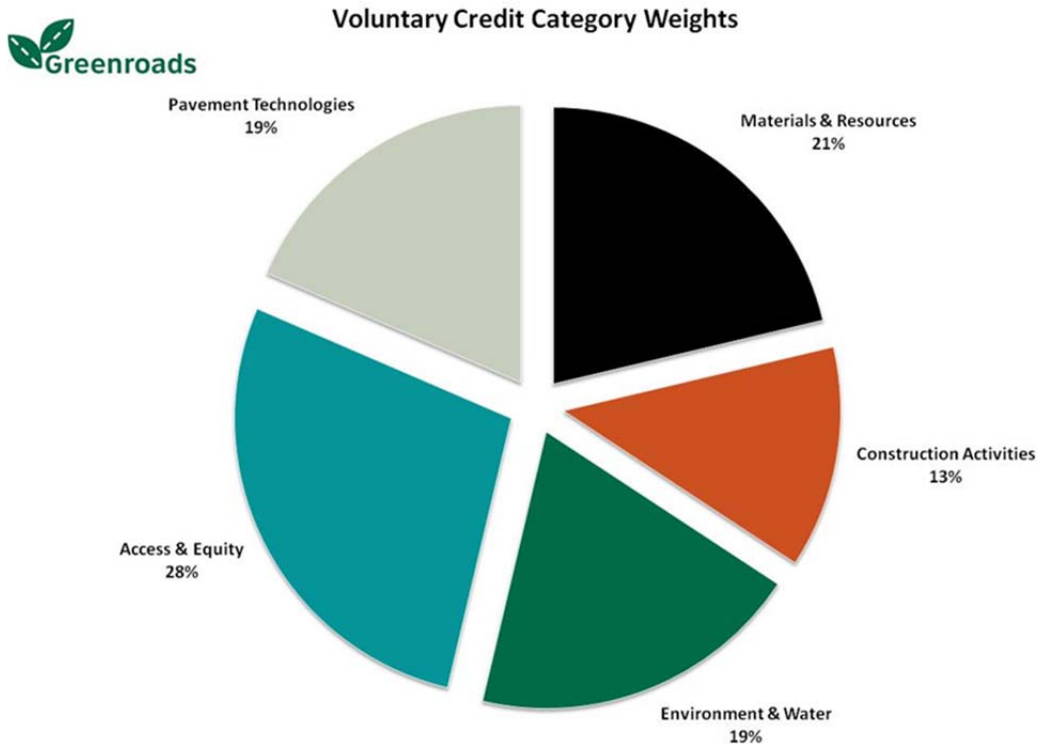
Credits are grouped into six Categories, with one additional Category that allows projects to earn points for innovative activities that are currently not recognized in the Rating System.

Important Notes

- Mandatory activities (Project Requirements) are not worth points
- All 11 Project Requirements must be completed to be eligible for a Certification Award
- Voluntary activities (all other credits) are worth between 1 to 5 points based on lifecycle impact

Table 1. Greenroads Credit Categories and Intent

Category Name	Intent
Project Requirements	Encourage environmentally responsible decision-making processes, have management plans in place for construction, establish a minimum baseline for every project that applies for certification.
Environment & Water	Promote best practices related to stormwater management and ecological resources within the project boundary
Access & Equity	Promote safety, access, and mobility improvements and features for users and operations of the roadway
Construction Activities	Promote responsible construction management, reduce use of fossil fuels and improve health and safety of construction workers
Materials & Resources	Promote responsible materials and energy management by combinations of recycling, reusing, and reducing both virgin and waste materials
Pavement Technologies	Highlight specific pavement engineering innovations and ideas or broad types of technologies or techniques which are well-established in practice and have direct sustainability benefits
Custom Credits	Recognize the implementation of sustainable or innovative ideas not included in the current version of the Rating System.


Figure 1. Relative Weights of Greenroads Credit Categories (108 Points Possible, Does Not Show Custom Credits)

MORE INFORMATION

More detailed information, including the full and abridged versions of the *Greenroads Manual*, which details the activities that are part of the Rating System, and the *Project Handbook*, which describes the details of the Project Rating Program, can be found on the Greenroads Website: <http://www.greenroads.org>.

CREDIT SUMMARY

The Greenroads Rating System v1.5 *Manual* has:

- 11 Project Requirements.
- 37 Voluntary Credits. 1 to 5 points each, 108 maximum possible.
- 118 total maximum points including 10 points for optional Custom Credit activities.

PROJECT REQUIREMENTS

To be eligible for a Certification Award, all 11 Project Requirements must be completed and documented. There are no points for any of these activities.

No.	Title	Pts.	Description
PR-1	Environmental Review Process	Req	Complete a comprehensive environmental review
PR-2	Lifecycle Cost Analysis (LCCA)	Req	Perform LCCA for pavement/bridge section
PR-3	Lifecycle Inventory (LCI)	Req	Perform LCI of pavement/bridge materials
PR-4	Quality Control Plan	Req	Have a formal contractor quality control plan
PR-5	Noise Mitigation Plan	Req	Have a construction noise mitigation plan
PR-6	Waste Management Plan	Req	Have a plan to divert C&D waste from landfill
PR-7	Pollution Prevention Plan	Req	Have a TESC/SWPPP
PR-8	Low Impact Development (LID)	Req	Complete a LID feasibility study
PR-9	Pavement Management System	Req	Have a pavement/bridge management system
PR-10	Site Maintenance Plan	Req	Have a roadside maintenance plan
PR-11	Educational Outreach	Req	Publicize sustainability information for project

ENVIRONMENT & WATER

No.	Title	Pts.	Description
EW-1	Environmental Management System	2	ISO 14001 certification for general contractor
EW-2	Runoff Flow Control	1-3	Reduce runoff quantity
EW-3	Runoff Quality	1-3	Treat stormwater to a higher level of quality
EW-4	Stormwater Cost Analysis	1	Conduct an LCCA for stormwater elements
EW-5	Site Vegetation	1-3	Use native low/no water vegetation
EW-6	Habitat Restoration	3	Restore habitat beyond what is required
EW-7	Ecological Connectivity	1 or 3	Connect habitat across roadways
EW-8	Light Pollution	3	Discourage light pollution

ACCESS & EQUITY

No.	Title	Pts.	Description
AE-1	Safety Audit	1-2	Perform roadway safety audit
AE-2	Intelligent Transportation Systems (ITS)	2-5	Implement ITS solutions
AE-3	Context Sensitive Solutions	5	Plan for context sensitive solutions
AE-4	Traffic Emissions Reduction	5	Reduce emissions with quantifiable methods
AE-5	Pedestrian Access	1-2	Provide/improve pedestrian accessibility
AE-6	Bicycle Access	1-2	Provide/improve bicycle accessibility
AE-7	Transit Access	1-5	Provide/improve transit accessibility
AE-8	Scenic Views	1-2	Provide views of scenery or vistas
AE-9	Cultural Outreach	1-2	Promote art/culture/community values

For credit details, including documentation requirements, visit greenroads.org/manual.

CONSTRUCTION ACTIVITIES

No.	Title	Pts.	Description
CA-1	Quality Management System	2	ISO 9001 certification for general contractor
CA-2	Environmental Training	1	Provide environmental training
CA-3	Site Recycling Plan	1	Have a plan to divert waste from landfill
CA-4	Fossil Fuel Reduction	1-2	Use alternative fuels in construction equipment
CA-5	Equipment Emissions Reduction	1-2	Meet EPA Tier 4 standards for non-road equip.
CA-6	Paving Emissions Reduction	1	Use pavers that meet NIOSH requirements
CA-7	Water Tracking	2	Develop data on water use in construction
CA-8	Contractor Warranty	3	Warranty on the constructed pavement

MATERIALS & RESOURCES

No.	Title	Pts.	Description
MR-1	Life Cycle Assessment (LCA)	2	Conduct a detailed LCA of the entire project
MR-2	Pavement Reuse	1-5	Reuse existing pavement sections
MR-3	Earthwork Balance	1	Use native soil rather than import fill
MR-4	Recycled Materials	1-5	Use recycled materials for new pavement
MR-5	Regional Materials	1-5	Use regional materials to reduce transportation
MR-6	Energy Efficiency	1-5	Improve energy efficiency of operational systems

PAVEMENT TECHNOLOGIES

No.	Title	Pts.	Description
PT-1	Long-Life Pavement	5	Design pavements for long-life
PT-2	Permeable Pavement	3	Use permeable pavement as a LID technique
PT-3	Warm Mix Asphalt (WMA)	3	Reduce production energy at plant for binders
PT-4	Cool Pavement	5	Contribute less to urban heat island effect (UHI)
PT-5	Quiet Pavement	3	Use a quiet pavement to reduce noise
PT-6	Pavement Performance Tracking	1	Relate construction to performance data

CUSTOM CREDITS

Up to 10 submittals for Custom Credits are allowed for all projects. Points for each credit range from 1 to 5 points, up to a maximum of 10 points possible to be earned on any project.

No.	Title	Pts.	Description
CC-1	Custom Credit 1	1-5	Design a new voluntary credit
CC-2	Custom Credit 2	1-5	Design a new voluntary credit

CERTIFICATION AWARD LEVELS

Level	Project Requirements	Minimum Pts.	Maximum Pts.	% of Voluntary Credits Achieved
Bronze	11	32	42	30-39
Silver	11	43	53	40-49
Gold	11	54	63	50-59
Evergreen	11	64	118	60+

For credit details, including documentation requirements, visit greenroads.org/manual.

APPENDIX B

Scoring Method



BASIC ASSESSMENT – STANDARD SCORECARD

The Greenroads Standard Scorecard (simply “Scorecard”) is completed using the approaches described below for Project Requirements, Voluntary Credits and Custom Credits.

PROJECT REQUIREMENTS

Project Requirements are evaluated based on the intent shown by actual Project documents or by verbal confirmation of intent. If clear intent is present, the Scorecard shows an “x” in the “Y(es)” column. If not, the “x” is placed in the “?” column. By design, it is *possible* to complete all 11 Project Requirements, so none will receive an “x” in the “N(o)” column. We recognize that this perspective is optimistic and that special constraints or local requirements may make some activities more difficult or onerous to document if certification is pursued.

- Demonstrating intent to complete a Project Requirement is sufficient for the purposes of this review. Most, if not all, Project Requirements can be addressed early in project decision-making. However, the complete documentation for all Project Requirements would be required if any future certification is to be pursued.
- For projects that are finalizing design or in construction at the time Greenroads is considered, it may be difficult or simply cost-prohibitive to meet the documentation requirements for certification (if desired). However, the goal of this review is to demonstrate the maximum project potential so that credits can be considered next time.
- Project Requirements carry no point value and do not add or subtract from the total score.

VOLUNTARY CREDITS

Voluntary Credits are evaluated based on the intent shown by actual Project documents or by verbal confirmation of intent. If clear intent is present, the Scorecard shows a number in the “Y(es)” column for the number of points achieved. If not, a number is placed in the “?” column, meaning that many points could be considered as feasible for the Project. A number for the remaining points is placed in the “N(o)” column only if those points would not be reasonable or practical for the Project based on known constraints and scope.

- Demonstrating intent alone to complete Voluntary Credits is sufficient for purposes of this review. This is because the elected Voluntary Credits can often change throughout the design and construction process and the purpose of this assessment is to demonstrate a potential score. Again, the approach used makes the required documentation needs very transparent for future certification efforts while also highlighting notable opportunities.
- Credits marked as “Y” or “?” in bolded text could potentially reduce cost or be completed at minimal or no additional cost to the initial construction price.
- Voluntary Credits carry a variety of values and range from 1 to 5 points. Please refer to the *Greenroads Manual* for further details on how Voluntary Credits are weighted.

CUSTOM CREDITS

Potential **Custom Credits** are evaluated similarly to the Voluntary Credits, but typically these are verbally described activities instead of documented activities. Custom Credits are submitted by registered projects pursuing certification and subjected to rigorous review prior to their approval for broad use in other projects. For purposes of this assessment, the Scorecard shows short titles that represent the basic concept of proposed Custom Credits as well as an estimated number of points. Points for Custom Credits are assigned according to the existing weighting scheme used in the *Greenroads Manual*.

DETAILED ASSESSMENT – ANNOTATED SCORECARD

An annotated version of the Standard Scorecard is provided for Detailed Assessments and Detailed Pilot Projects. The purpose of the Annotated Scorecard is to add depth to the information provided in the Standard Scorecard.

EFFORT TO COMPLETE

Greenroads estimates the level of effort that is anticipated or perceived to be needed to complete and document the credit given the context of the Project. The “Effort to Complete” section on the Annotated Scorecard reflects this estimate of effort the credit were to be pursued during Project Certification.

Specifically, Greenroads defines “effort” needed in the context of Project Certification by any of the following.

- Amount of documentation required by Greenroads
- Amount of time to provide and generate documentation that is in addition to standard project documentation
- Amount of resources that may or may not be physically available or accessible to complete a task, implement a technology or practice, or to document them
- Amount of money involved in earning and documenting a Greenroads credit
- Conflicts with existing regulatory standards, if any
- Conflicts with implementing Greenroads credits in the design process, if any
- Conflicts with implementing Greenroads credits in the construction process, if any
- Any learning curve that might be associated with a particular credit, requiring additional time investment

Scale

Effort is evaluated on a scale of low to high, and credits which were not appropriate or applicable to a particular project are marked as “N/A”. For Project Requirements, an “X” is used to indicate associated effort. For Voluntary Credits, points are shown according to their relative difficulty to achieve and their applicable point spread according to the *Greenroads Manual*.

Educated Estimate

The estimate of effort is based on our understanding of the Project, the existing research for a particular credit, experience with other projects, and the demonstrated intent to complete the credit based the stated goals of the Project Team in conversation or as otherwise demonstrated in documents provided for the Assessment.

However, estimated points in the Annotated Scorecard or the Standard Scorecard may not reflect actual Project conditions or its position for successful certification because documentation reviewed for Assessment purposes is limited. The estimates provided by Greenroads in no way imply that the Project *will* earn any particular credit and the information shown in the Scorecards should not be presumed to be a guarantee or statement of future approval under any circumstances.

NOTES

Specific comments about each credit are provided by the Greenroads Reviewer indicating where the intent was identified in the provided documents (if any) and some special comments regarding the credit for the Project Team to consider. This section does not influence the final computation of Greenroads Rating.

APPENDIX C

Greenroads Scorecards





Project Name
Location (City, State)
Project Manager
Project Budget
Current Status

SH-16 Causeway Upgrade
 Auckland, New Zealand
 Vanessa Browne
 \$220 million (NZD) (USD)
 Construction

Project Requirements (PR)		PR Max: 11	10	1	0
No.	Title		Y	?	N
PR-1	Environmental Review Process	Req	X		
PR-2	Lifecycle Cost Analysis	Req	X		
PR-3	Lifecycle Inventory	Req		X	
PR-4	Quality Control Plan	Req	X		
PR-5	Noise Mitigation Plan	Req	X		
PR-6	Waste Management Plan	Req	X		
PR-7	Pollution Prevention Plan	Req	X		
PR-8	Low-Impact Development	Req	X		
PR-9	Pavement Management System	Req	X		
PR-10	Site Maintenance Plan	Req	X		
PR-11	Educational Outreach	Req	X		

Construction Activities (CA)		CA Max: 14	4	10	0
No.	Title		Y	?	N
CA-1	Quality Management System	2	2		
CA-2	Environmental Training	1	1		
CA-3	Site Recycling Plan	1	1		
CA-4	Fossil Fuel Reduction	1 - 2		2	
CA-5	Equipment Emission Reduction	1 - 2		2	
CA-6	Paving Emission Reduction	1		1	
CA-7	Water Use Tracking	2		2	
CA-8	Contractor Warranty	3		3	

Environment & Water (EW)		EW Max: 21	10	11	0
No.	Title		Y	?	N
EW-1	Environmental Management System	2	2		
EW-2	Runoff Flow Control	1 - 3	1	2	
EW-3	Runoff Quality	1 - 3	1	2	
EW-4	Stormwater Cost Analysis	1		1	
EW-5	Site Vegetation	1 - 3	3		
EW-6	Habitat Restoration	3		3	
EW-7	Ecological Connectivity	1 - 3		3	
EW-8	Light Pollution	3	3		

Materials & Resources (MR)		MR Max: 23	7	15	1
No.	Title		Y	?	N
MR-1	Lifecycle Assessment	2		2	
MR-2	Pavement Reuse	1 - 5		5	
MR-3	Earthwork Balance	1			1
MR-4	Recycled Materials	1 - 5		5	
MR-5	Regional Materials	1 - 5	2	3	
MR-6	Energy Efficiency	5	5		

Access & Equity (AE)		AE Subtotal: 30	19	6	5
No.	Title		Y	?	N
AE-1	Safety Audit	1 - 2	2		
AE-2	Intelligent Transportation Systems	2 - 5	2	3	
AE-3	Context Sensitive Solutions	5	5		
AE-4	Traffic Emissions Reduction	5			5
AE-5	Pedestrian Access	1 - 2	2		
AE-6	Bicycle Access	1 - 2	2		
AE-7	Transit & HOV Access	1 - 5	3	2	
AE-8	Scenic Views	2	2		
AE-9	Cultural Outreach	1 - 2	1	1	

Pavement Technologies (PT)		PT Max: 20	2	17	1
No.	Title		Y	?	N
PT-1	Long-Life Pavement	5		5	
PT-2	Permeable Pavement	3		3	
PT-3	Warm Mix Asphalt	3		3	
PT-4	Cool Pavement	5		5	
PT-5	Quiet Pavement	2 - 3	2	1	
PT-6	Pavement Performance Tracking	1			1

Custom Credit (CC)		CC Max: 10	0	10	0
No.	Title		Y	?	N
CC-1	Greenroads STP	1 - 2		2	
CC-2	Workzone Safety	1 - 2		2	

All 11 PR Met?	No		
Greenroads Total (Max 118)	42	69	7



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Project Requirements (PR)			Intent		Effort to Complete				Verbal	Notes
No.	Title		Yes	No	Low	Med	High	N/A		
PR-1	Environmental Review Process	Req	X		X					The Construction Environmental Management Plan (CEMP) was submitted by the Project Team. This plan mentions the existence of an Assessment of Environmental Effects that was used to create the CEMP.
PR-2	Lifecycle Cost Analysis	Req	X		X				X	The Project Team has stated that this was done for pavement design. For Certification the Team would have to confirm that the completed analysis meets all the requirements of the credit.
PR-3	Lifecycle Inventory	Req		X	X					A Lifecycle Inventory has not been completed. The project would have to complete a Roadprint page or similar for Certification.
PR-4	Quality Control Plan	Req	X		X				X	The Project Team verbally confirmed that a Quality Control Plan is in place on the project.
PR-5	Noise Mitigation Plan	Req	X		X					A Construction Noise and Vibration Management Plan was submitted and mentions that Site Specific Noise Mitigation Plans will also be created. These would meet all requirements of this credit.
PR-6	Waste Management Plan	Req	X		X					A Waste Management Plan was submitted. This plan would need to include the actual tonnage of waste materials, their final destinations and associated costs.
PR-7	Pollution Prevention Plan	Req	X		X					A Construction Erosion & Sedimentation Control Plan was submitted. The final signed CESCOP would need to be submitted for Certification.
PR-8	Low-Impact Development	Req	X		X				X	The Project Team verbally confirmed that this was done. The project includes drainage structures and drainage planter strips that were designed using LID. Documentation would need to be submitted for Certification.
PR-9	Pavement Management System	Req	X		X				X	The Project Team has stated that NZTA has the appropriate management systems.
PR-10	Site Maintenance Plan	Req	X		X				X	The Project Team stated that the Causeway Alliance has Maintenance Plans in place for all major items on the project. These would need to be submitted for Certification.
PR-11	Educational Outreach	Req	X		X				X	There have been stakeholder meetings, presentations as local schools, other presentations, and an actively maintained website.
PR Max: 11					11	0	0	0		



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Environment & Water (EW)			Intent		Effort to Complete				Verbal	Notes
No.	Title	Pts.	Yes	No	Low	Med	High	N/A		
EW-1	Environmental Management System	2	X		2				X	The Project Team has stated that the Alliance has ISO 14001 Certification.
EW-2	Runoff Flow Control	1-3	X		1		2			The project team has stated that 100% of the runoff will be treated but it cannot be determined to what extent it will be treated without further documentation.
EW-3	Runoff Quality	1-3	X		1		2		X	The project team has stated that 100% of the runoff will be treated but it cannot be determined to what extent it will be treated without further documentation.
EW-4	Stormwater Cost Analysis	1		X	1					This credit is a possible extension to the PR-2 credit. This may have already been completed but that was not evident from gathered information.
EW-5	Site Vegetation	1-3	X		3				X	The Urban Design and Landscape Master Plan describes the usage of native and non-invasive planting. The Project Team confirmed that no permanent irrigation will be installed.
EW-6	Habitat Restoration	3		X			3			This credit is very difficult for a project of this size and scope.
EW-7	Ecological Connectivity	1-3		X			3			There are no dedicated structures for wildlife passage on the project.
EW-8	Light Pollution	3	X		3					The Urban Design and Landscape Master Plan describes the usage of lighting that is cut off and does not leave the site. The Project Team has also stated that installed fixtures will meet Dark Sky requirements.
EW Max: 21					11	0	10	0		



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Access & Equity (AE)			Intent		Effort to Complete				Verbal	Notes
No.	Title	Pts.	Yes	No	Low	Med	High	N/A		
AE-1	Safety Audit	1-2	X		2				X	The Project Team stated that 3rd party audit are completed every 3 months.
AE-2	Intelligent Transportation Systems	2-5	X		2		3		X	Overhead gantries with changeable information signs as well as CCTV cameras will be installed on the project.
AE-3	Context Sensitive Solutions	5	X		5					For certification, the CSS form provided on the website would need to be completed.
AE-4	Traffic Emissions Reduction	5		X				5		This credit is not applicable.
AE-5	Pedestrian Access	1-2	X		2					An improved shared used path is being constructed.
AE-6	Bicycle Access	1-2		X	2					An improved shared used path is being constructed.
AE-7	Transit & HOV Access	1-5		X	3		2		X	The Project Team stated that the roadway shoulders are designated for bus usage during time of congestion. Onramps also have separate lanes for trucks, transit, and HOV.
AE-8	Scenic Views	2		X	2					There are special bulbout areas with seating along the multi-use path for users to leave the traffic stream and enjoy the views. There will be related signage at these areas.
AE-9	Cultural Outreach	1-2	X		1	1				There will be some artwork included in the project but the extent is unknown. The Project Team has stated that the value will likely be between \$100,000 and \$200,000. This may not be enough to get the full 2 points, but there will also be signage and sculptures along the multi-use path related to local lwi sites.
AE Max: 30					19	1	5	5		



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Construction Activities (CA)			Intent		Effort to Complete				Verbal	Notes
No.	Title	Pts.	Yes	No	Low	Med	High	N/A		
CA-1	Quality Management System	2	X		2				X	The Project Team has stated that the Alliance has ISO 9001 Certification.
CA-2	Environmental Training	1	X		1				X	The Project Team has stated that there will regularly be specific environmental training on the project.
CA-3	Site Recycling Plan	1	X		1					The PR-6 Waste Management Plan document included many items that will be recycled on the project. The final plan will need to be submitted with quantities of materials and cost of recycling.
CA-4	Fossil Fuel Reduction	2		X			2			Alternatives such as LPG and hybrids vehicles may be considered to earn this credit based on a baseline calculation from standard equipment.
CA-5	Equipment Emission Reduction	2		X			2			This credit would be a challenge for local contractors as their equipment would have to meet USEPA air quality requirements.
CA-6	Paving Emission Reduction	1		X			1			The contractor would need to use equipment that meets NIOSH emissions requirements.
CA-7	Water Use Tracking	2		X	2					The Project Team stated that water usage for dust control may be tracked but not other water use.
CA-8	Contractor Warranty	3		X			3			The Project Team stated that there is a 2 year period in which the contractor is responsible for defects but the credit requires 3 years.
CA Max: 14					6	0	8	0		



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Materials & Resources (MR)			Intent		Effort to Complete				Verbal	Notes
No.	Title	Pts.	Yes	No	Low	Med	High	N/A		
MR-1	Lifecycle Assessment	2		X			2			This could be done retroactively. This credit is rarely pursued and very difficult.
MR-2	Pavement Reuse	1-5		X			5			The entire roadway is being raised for this project. The Project Team was not sure if the existing pavements are being left in place and new material placed on top. Some pavement milling will be reused in drainage structures.
MR-3	Earthwork Balance	1		X				1		Since the entire roadway is being raised 1.5 meters, it would be nearly impossible to balance earthwork.
MR-4	Recycled Materials	1-5		X		2	3			It was not clear if recycled materials will be used on the project. Pavement and structural mix designs along with recycled material calculations would need to be submitted for this credit.
MR-5	Regional Materials	1-5	X		2	3			X	The Project Team stated that a majority of the project materials should originate from the Auckland area, which would likely meet the requirements of this credit. Credit for 2 points is being shown here to be conservative.
MR-6	Energy Efficiency	5	X		5				X	The Project Team stated that LED lighting will be used on the project.
MR Max: 23					7	5	10	1		



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Pavement Technologies (PT)			Intent		Effort to Complete				Verbal	Notes
No.	Title	Pts.	Yes	No	Low	Med	High	N/A		
PT-1	Long-Life Pavement	5		X			5			The Project Team mentioned that the structures have a 100 year design life but that the overall structure is planned to be raised in 30 years time.
PT-2	Permeable Pavement	3		X			3			The Project Team mentioned that an open graded surface course will be used on the roadway to help convey water to the sides of the pavement but it is not pourous pavement.
PT-3	Warm Mix Asphalt	3		X			3			Asphalt paving was not included on the project.
PT-4	Cool Pavement	5		X			5			This credit could be achieved if albedo tests were submitted showing the concrete structure meets the requirements. A large of amount of the pavement surfaces are asphalt pavement however which may make this credit quite difficult.
PT-5	Quiet Pavement	2-3		X	2	1				The Project Team has stated that an open graded surface course will be used which should creat a quiet pavement. Noise test results and a map showing quiet pavement areas would need to be submitted for Certification.
PT-6	Pavement Performance Tracking	1		X				1		This credit is not applicable to this project.
PT Max: 20					2	1	16	1		



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Custom Credit (CC)			Intent		Effort to Complete				Verbal	Notes
No.	Title	Pts.	Yes	No	Low	Med	High	N/A		
CC-1	STP	1-2		X	1	1				The project can earn points by taking the STP exam.
CC-2	Workzone Safety	1-2		X	2					Performing Job Hazard Analyses and designating a Safety Officer can earn the project points.
CC Max: 10					3	1	0	0		