SB 1305

RELATING TO GROUNDWATER RECHARGE

Establishes an income tax credit for taxpayers who maintain permeable surfaces on their property. Permits a taxpayer to deduct from state income taxes the costs of certifying an organic agricultural operation or determining a qualifying property's net water infiltration.

WTL/AGL, WAM

NEIL ABERCROMBIE
GOVERNOR OF HAWAII

WILLIAM J. AILA, JR.
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

ESTHER KIA'AINA
FIRST DEPUTY

WILLIAM M. TAM
DEPUTY DIRECTOR - WATER

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
BUREAU OF CONVEYANCES
COMMISSION ON WATER RESOURCE MANAGEMENT
CONSERVATION AND COASTAL LANDS
CONSERVATION AND RESOURCES ENFORCEMENT
ENGINEERING
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

POST OFFICE BOX 621
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Testimony of
WILLIAM J. AILA, JR.
Chairperson

Before the Senate Committees on
WATER AND LAND
and
AGRICULTURE

Thursday, January 31, 2013
2:00 PM
State Capitol, Conference Room 225

In consideration of
SENATE BILL 1305
RELATING TO GROUNDWATER RECHARGE

Senate Bill 1305 proposes to increase aquifer recharge by establishing an income tax credit for businesses and agricultural operations that maintain permeable surfaces on their property. While the Department of Land and Natural Resources (Department) appreciates the intent of this bill, the Department respectfully opposes this measure for the following reasons.

First, it would be difficult to calculate the volume of water that percolates to recharge groundwater aquifers. At present, the Commission on Water Resource Management (Commission) uses complex recharge models developed by the United States Geological Survey to estimate recharge on an aquifer-wide scale based on long-term average climatic conditions. Computing annual recharge rates for specific parcels, as small as five-acres, would require a new numerical model that runs on real-time climatic data. Recharge models are complex and require considerable technical expertise to run.

While simpler equations may be used, these could not provide a true or accurate accounting of net water infiltration because they would not take into account: 1) Soil characteristics, such as soil moisture and storage capacity, which determine the amount of water that can infiltrate; 2) Actual evapotranspiration, which is a function of vegetation type and coverage and soil moisture, or which would need to be measured using lysimeters; or 3) Actual rainfall on the property.

Second, in rural areas, recharge may actually be enhanced by allowing water to collect and concentrate on impermeable surfaces, which would then drain to adjacent permeable surfaces prior to infiltration. However, this would not be the case in more urban areas where storm drains exist. Therefore, a comparison of the property with and without impermeable surfaces is required in order to more accurately determine whether impermeable land surfaces enhance or diminish net water infiltration for a specific parcel of land.

Third, there is a lack of a robust network of rainfall stations in Hawaii with which to estimate rainfall amounts and spatial variability. With the closure of the sugarcane plantations in the 1990's, many rain gage stations were discontinued. Hawaii experiences dramatic differences in rainfall over very short distances due to varied microclimates across the State. There are significant gaps in areal coverage. While rainfall may be estimated based on data extrapolated from the closest stations, there could be significant inaccuracies in the estimated versus actual rainfall on any given area.

Fourth, the bill does not identify the source of the recharge water. Is it only rainfall inputs or would return irrigation water also qualify? The Commission requires efficient water use in general, and over-irrigation for the purposes of aquifer recharge is not currently recognized as a beneficial use of diverted waters as a general policy.

Fifth, agricultural lands are by nature permeable land surfaces. Unless the agricultural operations are covered nurseries or hydroponic systems, impermeable surfaces are not conducive to the planting, growing, and harvesting of crops.

Sixth, the definition of "qualifying property" is too broad. As defined, almost any parcel of land greater than 5 acres that isn't paved over may be claimed as recreational land. Similarly, such parcels could claim to be an agricultural operation if there are any edible plants being grown. The Commission does not have expertise or authority to determine "qualifying property." The appropriate land use authorities would have to take that up.

The Commission also does not have any expertise or jurisdiction regarding organic agricultural operation certifications. That is a matter for the Department of Agriculture. While increasing groundwater recharge is in the interests of the State, this goal may be better achieved through the 1) Natural Resources Conservation Service's soil and water conservation plans and programs; 2) development of agricultural land management plans; or 3) by promoting low impact development best management practices

Thank you for the opportunity to testify on this measure.

LANDSCAPE INDUSTRY COUNCIL OF HAWAI'I

January 28, 2013

TESTIMONY FOR SENATE BILL N.O. 1305

SENATE COMMITTEE ON WATER AND LAND
AND
SENATE COMMITTEE ON AGRICULTURE

The Landscape Industry Council of Hawaii supports Senate Bill 1035 Relating to income tax credit for taxpayers who maintain permeable surfaces on their property.

Permeable paving surfaces have been demonstrated as effective in managing runoff from paved surfaces. Large volumes of urban runoff causes serious erosion and siltation of our ocean reefs.

Permeable paving surfaces keep the pollutants in place on the roadway, and allow water seepage to groundwater recharge while preventing the stream erosion problems. Permeable paving surfaces capture heavy metals from vehicle, preventing them from washing downstream and accumulating inadvertently in the environment. In the permeable paving void spaces, naturally occurring micro-organisms digest car oils, leaving little but carbon dioxide and water.

Establishing a tax credit for permeable paving surfaces is an excellent measure to reduce the impacts of stormwater erosion and silting our reefs.

If you have questions, please contact me at me at 799-3101 or email address chris.dacus@gmail.com.

Chris Dacus
President
Landscape Industry Council of Hawai'i
P. O. Box 22938, Honolulu, Hawai'i 96823-2938

Landscape Industry Council of Hawai'i
Hawaii's landscape industry has an economic impact of over $520 million annually and full time employment of over 11,000 landscape professionals. Formed in 1986, LICH is a statewide alliance representing Hawaii's landscape trade associations. LICH can be found online at www.landscapehawaii.org

NEIL ABERCROMBIE
GOVERNOR

SHAN TSUTSUI
LT. GOVERNOR

FREDERICK D. PABLO
DIRECTOR OF TAXATION

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To: The Honorable Malama Solomon, Chair
and Members of the Senate Committee on Water and Land

The Honorable Clarence K. Nishihara
and Members of the Senate Committee on Agriculture

Date: Thursday, January 31, 2013
Time: 2:00 P.M.
Place: Conference Room 225, State Capitol

From: Frederick D. Pablo, Director
Department of Taxation

Re: S.B. 1305, Relating to Groundwater Recharge

The Department appreciates the intent of S.B. 1305 and provides the following information and comments for your consideration.

S.B. 1305 establishes an income tax credit for maintaining permeable surfaces on a property to allow for groundwater recharge, as well as an income tax deduction for the costs of certifying an organic agricultural operation, as well as the costs of determining a property's net water infiltration for purposes of claiming the aforementioned credit.

The Department notes that, while this income tax credit is to be certified by the Department of Agriculture, the Department of Taxation maintains audit authority. The proposed tax credit will be extremely difficult for the Department to administer, because the accuracy of any amounts claimed under the credit can only be determined by a "geologist, hydrologist, soil agronomist, or related professional," and it would be necessary to retain such an expert to determine if the credit were properly claimed by any given taxpayer.

The Department additionally notes that the value of the tax credit is not explicitly stated—the value is "ten per cent of the value of the volume of water permitted to percolate into the groundwater aquifer" but no explanation of what rate per unit volume is given. To clarify, the bill does not indicate how the volume of water should be measured, e.g. in gallons or liters, or what value should be ascribed to any particular unit of volume. If the intent is to use an industry standard for measurement of this value, the bill should so indicate. The bill should also indicate the relationship between dollar amount of the credit and volume of water that is allowed to percolate into the aquifer.

Thank you for the opportunity to provide comments.

L E G I S L A T I V E

TAXBILLSERVICE

126 Queen Street, Suite 304 TAX FOUNDATION OF HAWAII Honolulu, Hawaii 96813 Tel. 536-4587

SUBJECT: INCOME, Credit for permeable surfaces; deduction for net water infiltration certification

BILL NUMBER: SB 1305; HB 1394 (Identical)

INTRODUCED BY: SB by Dela Cruz; HB by Har, Aquino, Cullen, Ichiyama, Oshiro, Say, Tsuji, Yamashita

BRIEF SUMMARY: Adds a new section to HRS chapter 235 to allow a taxpayer to claim a permeable surfaces tax credit equal to 10% of the value of the volume of water permitted to percolate into the groundwater aquifer, as determined by a geologist, hydrologist, soil agronomist, or related professional, based on: (1) the net water infiltration; (2) the area of permeable surface available for groundwater recharge; and (3) an average water utility rate determined by the public utilities commission. This rate shall be doubled for: (1) operations actively irrigating with reclaimed wastewater, gray water, or brackish water; (2) business or agricultural operations operating in an area found to be under drought conditions; or (3) organic agricultural operations as certified by the U.S. Department of Agriculture.

Defines "permeable surface" as a ground surface that permits water to infiltrate at a rate in excess of 0.1 feet per day and "net water infiltration" as the amount of water that penetrates the ground surface, in excess of evaporation and plant consumption, per unit of time as determined by a geologist, hydrologist, soil agronomist, or related professional. Also defines "organic agricultural operation" and "qualifying property" for purposes of the measure.

Requires the taxpayer to provide information to the chairperson of the board of land and natural resources on the net water infiltration of the qualifying property for each calendar year that the tax credit is claimed. This information shall be verified by a geologist, hydrologist, soil agronomist, or related professional.

Upon verification of the information provided by the taxpayer, the department of land and natural resources shall issue a certificate to the taxpayer verifying the credit amount certified for each tax year. The taxpayer shall file the certificate with the department of taxation.

Credits in excess of a taxpayer's income tax liability may be used as a credit against the taxpayer's income tax liability in subsequent years until exhausted. Requires all claims for the credit, including amended claims, to be filed on or before the end of the twelfth month following the close of the taxable year for which the credit may be claimed. Requires the director of taxation to prepare forms that may be necessary to claim a credit under this section. The director may also require the taxpayer to furnish information to ascertain the validity of the claim for credit made under this section and may adopt rules necessary to effectuate the purposes of this section pursuant to chapter 91.

Adds a new section to HRS chapter 235 to establish an income tax deduction for the amount paid during the taxable year by a taxpayer to obtain: (1) certification of an organic agricultural operation; or (2) a determination of the net water infiltration of a qualifying property's net water infiltration by a geologist, hydrologist, soil agronomist, or related professional; provided that these amounts were paid for the purpose of claiming the permeable surfaces tax credit.

Requires the director of taxation to prepare any forms that may be necessary to claim the deduction and may also require the taxpayer to furnish reasonable information to ascertain the validity of such claim.

EFFECTIVE DATE: Tax years beginning after December 31, 2012

STAFF COMMENTS: This measure proposes an income tax credit to encourage taxpayers to maintain a permeable surface that lets water pass through and reach the groundwater aquifer. It also proposes an income tax deduction to allow the taxpayer to deduct to the cost of the certification necessary to claim the permeable surface income tax credit. It should be remembered that the tax system is not an efficient method to accomplish such goals. In addition, since the proposed measure would grant preferential treatment to a select group of taxpayers at the expense of other taxpayers who are ineligible for the credit, its enactment cannot be justified.

It should be remembered that tax credits generally are designed to alleviate an undue burden on those who are unable to carry that burden, largely the poor and low income. The adoption of this measure would result in nothing more than a subsidy by the state to certain taxpayers with permeable surfaces and would not in any way address the taxpayer's need for tax relief. While this measure also proposes an income tax deduction for the cost of certification to qualify for the credit, it is an indirect subsidy by the state for the cost and results in an equal amount of revenue which will not be available for essential services and programs provided by the state.

If the intent of this measure is to have government pay for some of the cost of this activity, then a direct appropriation of general funds would be far more transparent and accountable than an unbridled tax credit or exemption. What this and many of the tax incentive proposals recognize is that it is costly to do business in the state as entrepreneurs have to navigate the treacherous waters of state and county permitting and regulations. It is costly because to comply with these rules and regulations and securing of permits takes time which, in turn, erodes the financial investment of investing in Hawaii. Lawmakers don't seem to understand that with each passing day attempting to comply with a rule or ordinance, that day costs the investor money as the finance charges mount with no compensating cash flow to offset those hidden costs. In this case the proposal attempts to provide an incentive to help recharge the aquifer or net water infiltration. Again, the taxpayer has to comply with the regulatory requirements to secure the appropriate certification. Instead of trying to subsidize the taxpayer with a tax credit or exemption, government should determine how it can make the process easier and more efficient as a way to minimize the cost of undertaking such projects.

Lawmakers need to take a good look and see that, on one hand they are scrounging for money attempting to raise new funds with everything from user fees to taxes on specific groups of people and, on the other hand, introduce measures like this one. If all of the tax give-aways that have no rational basis were adopted, they would probably bankrupt the treasury. It should be repeated over and over again that the tax system is not designed to provide some sort of lure to attract the taxpayer into doing or acting in some sort of unusual way, but that the tax system exists to raise the funds necessary to operate government. Lawmakers may want to propose various tax breaks for their constituents while continuing to squander the tax resources on more public programs and personnel. However, doing so raises the question of whether or not elected officials have any clue about what their fiduciary responsibility is. This is indeed sad as the voting public has entrusted these elected officials with their hard-earned tax dollars.

Digested 1/30/13

From: mailinglist@capitol.hawaii.gov
To: WTLTestimony
Cc: dydascov@yahoo.com
Subject: Submitted testimony for SB1305 on Jan 31, 2013 14:00PM
Date: Wednesday, January 30, 2013 9:36:18 AM

SB1305
Submitted on: 1/30/2013
Testimony for WTL/AGL on Jan 31, 2013 14:00PM in Conference Room 229

Submitted By	Organization	Testifier Position	Present at Hearing
Vince Dydasco	Individual	Support	No

Comments: I believe Permeable paving surfaces will help with our run off, erosion, and pollution problems. They have demonstrated the ability to keep the pollutants in place on the roadway, and allow water seepage to groundwater recharge while preventing the stream erosion problems. Permeable paving surfaces capture heavy metals from vehicle, preventing them from washing downstream and accumulating inadvertently in the environment. In the permeable paving void spaces, naturally occurring micro-organisms digest car oils, leaving little but carbon dioxide and water.

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From: mailinglist@capitol.hawaii.gov
To: WTLTestimony
Cc: vverawudh@group70int.com
Subject: Submitted testimony for SB1305 on Jan 31, 2013 14:00PM
Date: Wednesday, January 30, 2013 9:31:18 AM

SB1305
Submitted on: 1/30/2013
Testimony for WTL/AGL on Jan 31, 2013 14:00PM in Conference Room 229

Submitted By	Organization	Testifier Position	Present at Hearing
vi verawudh	Individual	Support	No

Comments: General public does not know about the benefit of permeable surface. My neighbor just paved all his front yard and planting strip along County sidewalk because they dont want to deal with cutting grass and pulling weed. Tax credit will interest them in learning more and provide an incentive for them to maintain permeable surface. Paving planting strip along County sidewalk with impermeable surface should also be made illegal.

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FUTURA STONE
CONCRETE · STONE · MASONRY

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FUTURA
INTERLOCKING PAVERS

January 29, 2013

TESTIMONY FOR SENATE BILL N.O. 1305
SENATE COMMITTEE ON WATER AND LAND
and
SENATE COMMITTEE ON AGRICULTURE

Futura Stone of Hawaii is a local supplier of specialty paving products in the State of Hawaii for over 30 years and supports Senate Bill 1305 which provides tax credits for taxpayers who maintain permeable surfaces on their property.

Futura Stone of Hawaii has been actively promoting "Aqua Pave" permeable paving for the past three years and has hosted workshops for dozens industry professionals such as the Army Corps of Engineers Regional Technical Center, Airport DOT, Hawaii DOT, City Design Branch, Architecture Firms, Civil Engineering Firms and many more. We have also worked with Developers, Property Management Firms as well. Most folks love the idea of stormwater quality and quantity management and want to install these Low Impact Designs into new or existing projects however, costs have precluded them from moving forward.

Senate Bill N.O. 1305 would no doubt provide incentive to utilize permeable pavements which will greatly benefit the public in part by mitigating stormwater pollution flowing into our oceans, reducing stormwater quantities which overburden our existing stormdrains and leads to flooding and allows a mechanism to harvest and reuse stormwater for irrigation, outdoor lavatories and many other uses. Permeable pavements also meet or improve site pre development hydrology levels.

More information on Aqua Pave on-site Stormwater Source Control System.

What is AquaPave®?

The AquaPave® Permeable On-Site Stormwater Source Control System is an important first effort to reduce excess stormwater runoff quantities and improve water quality.

The AquaPave® system allows commonly recurring rainstorms to infiltrate through a permeable concrete pavingstone surface into a clear crushed open-graded aggregate base before being released into storm sewers or watercourses. Known as permeable interlocking concrete pavement, the system acts as an infiltration facility for the storage, treatment, and improvement of released water.

If the soil subgrade and underlying geology are suitable, some or all of the water can infiltrate directly into the subgrade, thereby substantially reducing outflow rates. Alternately, the surface water can be temporarily stored in the sub-base before being slowly released into the receiving water system. The AquaPave® system helps to clean and improve the quality of runoff water by filtration through the base and microbial action. In many instances, the outflow can be re-used for irrigation of domestic and commercial landscapes.

How AquaPave® Works

All AquaPave® pavers and slabs provide drainage through vertical channels that allow water through the surface at a rate of approximately 2.5 litres/sec/m² or 354 inches/hour.

AP SC1000 and Inbitex® are integral to the overall function of the AquaPave® system. AP SC1000 is composed of high-tenacity monofilamentand slit tape polypropylene yarns, which are woven into a stable network such that the yarns retain their relative position. The AP SC1000 acts as a barrier between the native soil and the controlled environment of the AquaPave® system. AP SC1000 is inert to biological degradation and resists naturally encountered chemicals, alkalis, and acids.

Inbitex® is a thermally bonded nonwoven geotextile. Inbitex® is often referred to as the 'heart of the system' because it was specifically developed to optomize the cleansing of water entering the system. The various characteristics have been combined to create a unique geotextile that aids in the development of naturally occuring microbes, and offers them refuge during periods of drought. The Inbitex® removes in excess of 99% of all hydrocarbons (oil, gasoline, diesel) and 97% of other pollutants including heavy metals from vehicle exhaust from the stormwater that passes through the system. This 'gray water' can either be safely released into the groundwater, storm sewers, watercourses or harvested for irrigation.

Benefits of AquaPave®

Lower Construction Costs

In conventional drainage design, infiltration and detention facilities are separate from impervious parking lots and pedestrian areas. AquaPave® On-Site Stormwater Source Control System combines the parking, infiltration and detention facilities into one location, allowing more space on the site for income-generating buildings. With the water detention facilities located below ground, we eliminate public safety concerns associated with the accidental drownings. This also eliminates the breeding areas for insect born diseases such as West Nile Virus.

For some designs there will also be cost savings through the reduction or elimination of typical stormwater management infrastructure, including collection works, water retention ponds, treatment systems (e.g. oil/water separators), and associated appurtenances.

Considering the ever increasing cost of oil, AquaPave® is becoming comparable in unit price to other traditional paving systems. Couple this with the increased design life equivalent and you have a superior, more aesthetically pleasing surface at a lower cost. With its flat continuous surface, AquaPave® accepts pavement marking materials such as paint and thermal plastic tapes.

Reduction of Runoff
With an open surface area of about 2%, the openings can infiltrate as much as 354 in./hr (9000 mm/hr or 9000 litres/m²/hr). The infiltration rate of the clear crushed open-graded aggregate used for the bedding and base is similar. For design purposes, a conservative 90% reduction in efficiency is generally assumed for infiltration facility design, due to the build-up of sediment over years from lack of maintenance. When considering a 90% reduction of initial infiltration as a typical design assumption, the AquaPave® On-Site Stormwater Source Control System will still capture, treat, infiltrate, and filter rainstorms over 35.4 in./hr (900 mm/hr or 900 litres/m²/hr). This includes the commonly recurring storms, which generate the majority of pollutants, and is many times in excess of even the 100 year events.

Recharging the Groundwater Table
With "Full Exfiltration" and "Partial Exfiltration" systems, some if not all of the rain water that falls on the paved area is allowed to infiltrate into the ground and recharge the local groundwater table. Groundwater is not only a primary source of drinking water, but it also maintains the base flow characteristics of our watercourses between precipitation events.

Roof Water Management
Roof water can be discharged into the sub-base. With gravity fed drainage it is recommended that the water is introduced into the sub-base by means of a sump with a manhole cover adjacent to the paved area. Any debris can be easily caught and cleared. The water is then dispersed within the system via a permavoid distribution tank or perforated outlet pipe. With siphonic drainage, a special chamber is used to disperse the water within the sub-base.

Management of Oil Contaminates
"*The runoff from parking lots represents the biggest single source of tonnages of oil going into the ocean*" - Brian Giroux, Port Hardy Forum on the Development of Off-shore Oil Exploration & Drilling.

Oil drippings and related hydrocarbons are typically digested within the base through filtering and microbial action. Research by Coventry University, England on microbial action has shown that the AquaPave® system is capable of bioremediation at the rate of 400 grams (0.88 lbs.) of oil per square metre (approx. 11ft²) per year. Severe hydrocarbon contamination can be dealt with by feeding the affected areas with slow release fertilizer. In addition, the pH of water exiting the system can be raised slightly which assists in buffering lower pH acid rain.

Filtering and Treatment of Pollutants
Studies of permeable interlocking concrete pavement have shown substantial reduction of non-point source pollutants in runoff. The clear crushed open-graded aggregate base has a storage volume of at least 30%. This storage capacity enables a decrease in peak flows and treatment of pollutants, especially nutrients and total suspended solids prior to drainage of the water from the base through drain pipes. Substantial reductions of metals can occur in full or partial base exfiltration designs where the water enters silt and clay soils.

Pedestrian Friendly
The AquaPave® patented design was created to accommodate all types of pedestrian traffic. Unlike other permeable pavements, the AquaPave® system does not incorporate loose aggregates on its surface, making it safer and more comfortable to walk on, even with high heels. The result is a flat smooth walking surface for customers and employees, completely free of water build up. AquaPave® is ideal for high foot traffic areas like building entrances, parking lots, inspection areas, and bike paths.

LEED® Green Building Rating System
The Leadership in Energy and Environmental Design (LEED®) rating system uses a point system to recognize environmentally conscious site and building designs. LEED® is a design guideline used by some agencies for certification. It is a voluntary, consensus-based rating system to encourage sustainable construction sites, and buildings. In the USA it is administered by the U.S. Green Building Council (www.usgbc.org) and in Canada by the Canadian Green Build Council (www.cagbc.org). More information can also be obtained in ICPI Tech Spec 16 (Achieving LEED® Credits with Segmental Concrete Pavement). The AquaPave® Permeable On-site Stormwater Source Control System can be eligible for earning points under LEED®. For example, SS Credit 6.1 offers 1 point for stormwater management on building sites where the existing impervious surface is greater than 50%. The LEED® requirement is that runoff rate and quantity be reduced by at least 25%. The AquaPave® system can reduce runoff rates and quantities from common storms by as much as 100%.

Another opportunity is MR Credit 5.1 (1 to 2 points) that requires a minimum of 20% of building materials manufactured within a radius of 800 km (500 miles). MR Credit 5.2 earns an additional point if 50% of the regionally manufactured materials are extracted, harvested or recovered within this same radius. Most AquaPave® projects will be within this distance from the manufacturer's plant, earning these credits.

There is also SS Credit 6.2 (1 point), Stormwater Management Treatment. (Additional LEED® points are available, see page 16 under Water Harvesting.)

Access for People With Disabilities
AquaPave® paving units have gaps less than 13 mm wide, which meet the recommendations of the Americans with Disabilities Act Accessibility Guidelines (ADAAG). Since AquaPave® does not need to be sloped to drain, access for the disabled can be made easier. AquaPave® provides a safe, smooth surface free of loose aggregates ensuring a reliable footing for the elderly or disabled using canes, crutches, walkers, or wheelchairs.

Slip and Skid Resistance
The ADAAG recommends that the slip resistance, expressed as a minimum coefficient of friction, be 0.6 for accessible routes and 0.8 for ramps. Testing conducted on behalf of the ICPI has verified that pavers, with the exception of pavers with polished surfaces, meet these guidlines. Vehicular skid resistance tests have demonstrated that stopping distances are shorter at speeds up to 40 MPH than either asphalt or typical concrete surfaces. Since the surface of the AquaPave® system consists of concrete pavers, the same resistance to skidding and shorter stopping distances can be expected. Couple this with the rapid infiltration of water, and the result is a reduction in accidents and increased safety.

Geothermal Systems
The AquaPave® Geothermal System is capable of reducing a building's reliance on gas or electricity for heating and cooling. This system combines the technology of the permeable pavement with geothermal technology using a patented sub-base and ground source heat pump (GSHP). The heat pump moves heated water through either underfloor heating, enlarged radiators or by fan coils to heat the building. Cooling is simply achieved by reversing this cycle.

The typical payback period on a standard system when balanced and operated correctly is approximately 6 years, after which, other than the cost of running the heat pump, heating and cooling costs are completely removed. There is no requirement for the burning of fossil fuels in this system as it uses 'environmentally friendly' and sustainable methods. This can reduce Carbon Dioxide emissions by over 50%, and more importantly can show a reduction of up to 50% on energy bills.

As with our other AquaPave® systems, the AquaPave® Geothermal System also combines parking, infiltration, and detention facilities, into one location, allowing more space on the site for income-generating buildings.

The AquaPave® Geothermal system works by utilizing the voided sub-base to generate sufficient energy to allow the exchange of heat into buildings during cold periods and out of the building in the summer months. This is achieved by the pump using the constant temperature of the ground surrounding the installation which is typically used in summer months as a heat sink, and then in colder times as a source of heat.

There is an ambient temperature in the subgrade of 10°C (50°F) and it is the temperature differential between the loop and the ground that creates the energy produced within the refrigerant that affects the heat exchanger (GSHP). The ground source heat pump acts in a similar manner to a refrigerator, a series of collector loops are set horizontally within the sub-base. It is the refrigerant in the loop that passes the heat to the pump, this then goes through a compressor that channels the heat into the building via under floor heating, radiators or fan coils.

Although the pump is powered by electricity, this use of electricity is mitigated by a performance coefficient in excess of 4:1 i.e. you will get four units of energy for every one you put in, therefore reducing the overall use of non sustainable energy.

Futura Stone of Hawaii recently completed the first Aqua Pave Permeable parking lot in Lanai Kai.

Site: Kaelepulu Stream – Next to Buzz's Steak House.
Owner: State of Hawaii.
Managed: City and County Department of Parks and Recreation.

Project Owner: Hui O Koolau Poko.
Designer: Hughes and Hughes Design.
Qty: 6000 sf.

Please contact me should you have any questions.

Richard Cozzo
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ICPI certified
Aqua Pave certified

From: mailinglist@capitol.hawaii.gov
To: WTLTestimony
Cc: calb737@hotmail.com
Subject: Submitted testimony for SB1305 on Jan 31, 2013 14:00PM
Date: Tuesday, January 29, 2013 4:41:30 PM
Attachments: 2013_Landscape_Legislature_Bills.xlsx

SB1305
Submitted on: 1/29/2013
Testimony for WTL/AGL on Jan 31, 2013 14:00PM in Conference Room 229

Submitted By	Organization	Testifier Position	Present at Hearing
Calvin Lum	Individual	Support	No

Comments:

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From: mailinglist@capitol.hawaii.gov
To: WTLTestimony
Cc: laustafford@gmail.com
Subject: Submitted testimony for SB1305 on Jan 31, 2013 14:00PM
Date: Tuesday, January 29, 2013 3:18:18 PM

SB1305
Submitted on: 1/29/2013
Testimony for WTL/AGL on Jan 31, 2013 14:00PM in Conference Room 229

Submitted By	Organization	Testifier Position	Present at Hearing
stafford lau	Individual	Support	No

Comments: I support tax credits towards permeable pavers. System works well and I atest I have no flooding problems. It is also enviromentally benefical filtering pollutants.

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To: WTLTestimony
Cc: allans@irrigationhawaii.com
Subject: Submitted testimony for SB1305 on Jan 31, 2013 14:00PM
Date: Monday, January 28, 2013 6:00:35 PM

SB1305
Submitted on: 1/28/2013
Testimony for WTL/AGL on Jan 31, 2013 14:00PM in Conference Room 225

Submitted By	Organization	Testifier Position	Present at Hearing
Allan Schildknecht	Individual	Support	No

Comments: I think this would be a great way to encourage landowners to reduce runoff and improve water quality. I recommend support for this Bill which has been adopted in other states with great success.

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