WHO TURNED UP THE HEAT?

One of the fastest growing American cities in the past 25 years, Atlanta's population is up about 65% since 1970. Since more people means more development, and more development means more buildings and fewer trees. Atlanta's heavy forest canopy has declined 16% in the years between 1973 and 1992. This represents an enormous transition from forested landscape to urban landscape, and the change has upset the land-atmosphere-energy balance. Concurrent with the destruction of forestland, there was a huge increase in the amount of dark surface added to the landscape in the form of roads, parking lots and roofs. Taken together, these have created an urban heat island out of control.

URBAN HEAT ISLANDS AND UNHEALTHY AIR

Aside from spawning quirky and potentially destructive weather, urban heat islands promote other unwanted side effects, most notably, more frequent smog and an increase in ground-level ozone. Prolonged exposure (6-8 hours) to ground-level ozone (the primary component of smog) can cause permanent respiratory problems in children, the elderly, active adults who engage in outdoor activities, and more critically, people with asthma and chronic lung problems.

A recent CNN report cited an elementary school in Houston, Texas, that uses a smog meter to determine if it's safe for children to go out on the playground. Even conditioned athletes are cautioned before engaging in strenuous outdoor activities.

Ground-level ozone can also have an adverse effect on vegetation and the ecosystem. Since poor air quality is intensified by urban heat islands, anything that can help to cool a heat island is worth a serious look.

Heat and Poor Air Quality: Development's Silent Demons

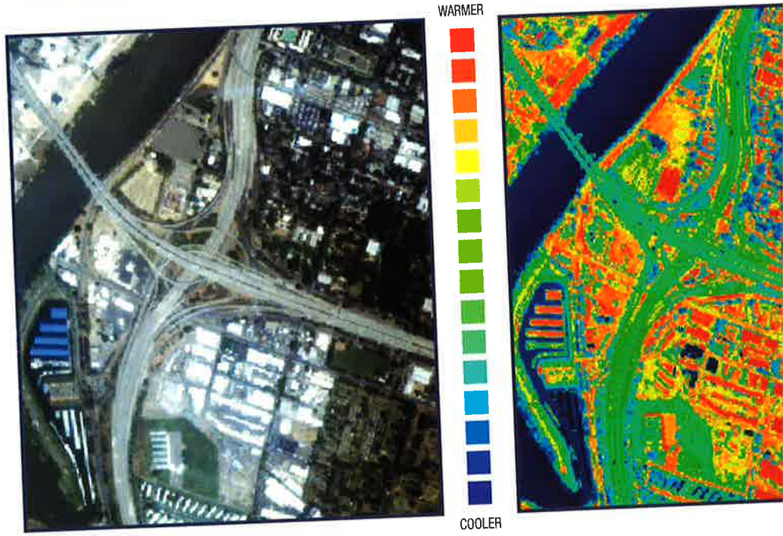
Think of it as a cascade: heat creates unhealthy air; unhealthy air raises EPA concerns; EPA concerns stop the flow of federal money. And the absence of federal money creates reluctance among private interests to fund new projects.

If this seems far-fetched, look no further than Atlanta. Since 1998, annual federal highway funding has come to a halt because of non-compliance with the EPA Clean Air Act. The heat-derived ozone in Atlanta has created such poor air quality that $600 million was withheld. The funding will only be available when Atlanta complies with air quality standards agreed upon by the city, EPA, DOT and local environmental groups.

Predictably, this scenario has become an ongoing nightmare for developers. Development, which was proceeding at an active pace and creating new jobs and new communities, has slowed. The reason is simple: with no money for infrastructure, there's no money for what the infrastructure would support. From the developers' perspective, it's nearly impossible to build new homes and businesses without expanding the highway system. Without highways, everything else grinds to a halt. Unfortunately, that's the situation in Atlanta.

A BIRD'S EYE

To understand the relationship be
patterns and heat production - an
the lowest layers of the atmosphe
Hydrology and Climate Center (
National Aeronautics and Space A
(NASA) conducted an Atlanta ur
experiment in May 1997. The re
surface radiant temperatures in u
from 6° to 12°F higher than the
undeveloped countryside; and th



SACRAMENTO, CALIFORNIA

Concrete highways in Sacramento are cooler than surrounding darkly paved areas, according to NASA thermal infra

RETE SOLUTIONS FOR COOLING

ctates that the quickest and most
or urban heat islands is to replace
lighter colored surfaces and to use
terials in new construction. At the
nities and developers need to
eforestation programs, replacing
getation lost to development. This
to beautify the landscape, but
slowly, they take much longer to
effect on urban heat islands.

t can play a key role in reducing
immediately. Because concrete
absorbs less heat. Since roads
e relatively large areas, paving
provides a great deal of cooler
.

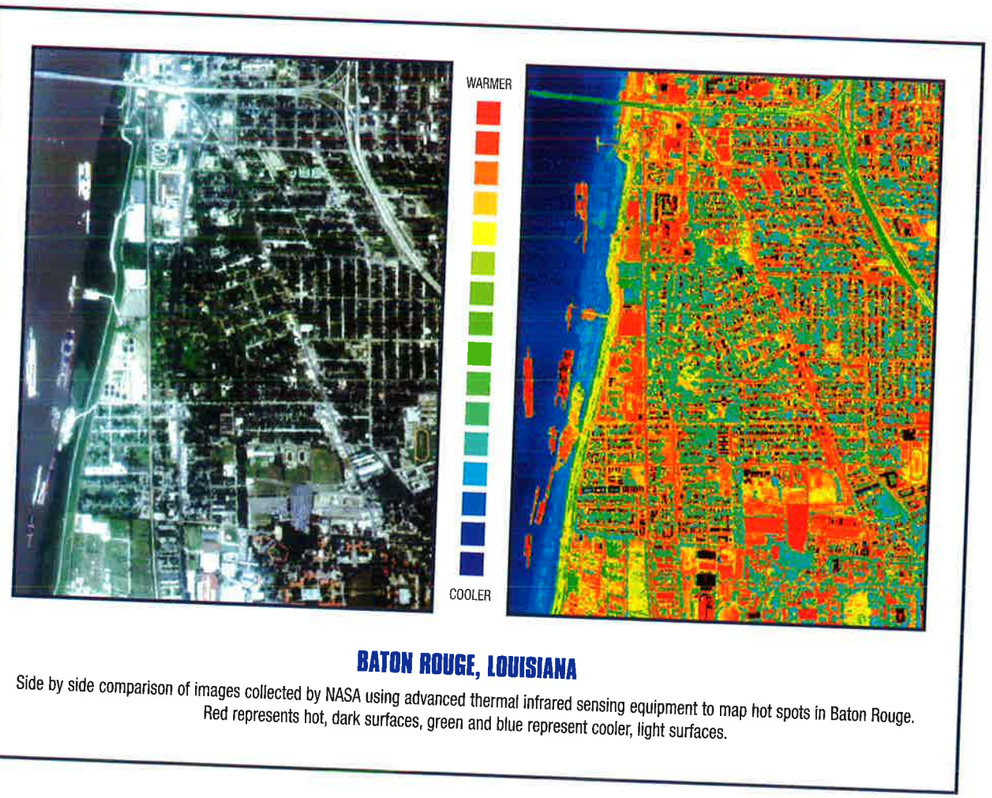
ificantly higher reflectivity than
As a consequence, concrete is
han asphalt," says Dale A.

Quattrochi, Senior Research Scientist with NASA at Marshall Space Flight Center in Huntsville, Alabama.

There are also secondary benefits to paving with concrete. It is resource efficient, energy efficient, recyclable and durable. It is also made with some

Urban Heat Islands and Local Weather

There is hard evidence that urban heat islands generate their own weather systems. For example, atmospheric data show that the Atlanta urban heat island is responsible for generating more precipitation and creating low pressure areas above the city. This creates violent thunderstorms that spring up over the downtown sector and move out to suburban areas, wreaking havoc on the surrounding area. Scientists have documented similar phenomena in St. Louis, Missouri. Though the rain from thunderstorms may sometimes be welcome, thunderstorms would be less welcome if they were to spawn flash floods or tornadoes.



BATON ROUGE, LOUISIANA

Side by side comparison of images collected by NASA using advanced thermal infrared sensing equipment to map hot spots in Baton Rouge. Red represents hot, dark surfaces, green and blue represent cooler, light surfaces.

OF KILOWATTS AND DOLLARS

On a hot afternoon in Los Angeles, which is one of the largest urban heat islands on Earth, the demand for power rises nearly 2% for every one-degree Fahrenheit increase in the daily maximum temperature. Translated into dollars, this costs Los Angeles ratepayers an additional $100,000 per hour, or nearly $100 million a year. Heat is expensive and wasteful.

GLOBAL WARMING AND THE HEAT ISLAND PHENOMENON

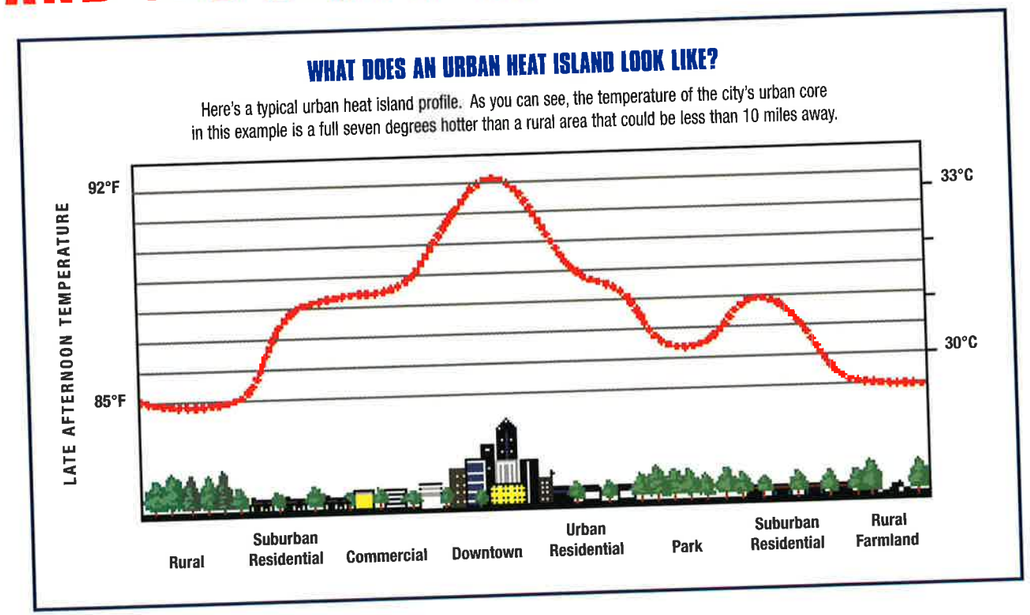
The Earth is hotter now than it was 150 years ago, and it's getting hotter still. Global warming appears in the news with increasing frequency, and rightly so. Though there is universal agreement that global warming exists, there is intense debate about what causes it. But whether the Earth's temperature is rising as a result of natural or man-made phenomena, or a combination of the two, one thing is certain: most people ignore the problem and assume someone else will fix it.

What is global warming? Quite simply, it's the rise in the Earth's temperature due to the release of so-called "greenhouse gases." These gases are carbon dioxide, methane, hydrofluorocarbons and water vapor, which break down the Earth's upper ozone layer. Ozone in the upper atmosphere occurs naturally and provides protection from the sun's ultra-violet rays. However, at ground level, ozone combines with heat, nitrogen oxides and volatile organic compounds, making it an air pollutant that is extremely harmful to human health.

In 1997, the United Nations convened representatives of 160 nations in Kyoto, Japan, to address the problem. There they adopted a plan that would require individual countries to reduce the amounts of carbon dioxide and other greenhouse gases they release into the atmosphere by an average of 5% below what each country's emission levels were in 1990. (This means a 7% target for the United States.) However, the deadline to reduce those emissions isn't until 2012, and a significant amount of additional damage could occur in the meantime.

WHAT DOES AN URBAN HEAT ISLAND LOOK LIKE?

Here's a typical urban heat island profile. As you can see, the temperature of the city's urban core in this example is a full seven degrees hotter than a rural area that could be less than 10 miles away.



Urban Heat Islands: Unwanted Warming on a Local Scale

If global warming is a worldwide phenomenon, urban heat islands are the same thing on a smaller scale. A "heat island" is the area in and around a city's urban core where the air temperature can be anywhere from 6° to 12°F hotter than the surrounding countryside. Though there's ongoing debate about the source of global warming, there's no debate about the source of urban heat islands: they're 100% man-made. And because they're man-made, they're easier to correct. One way to reduce global warming is to start by reducing temperatures from urban heat islands.

These urban heat islands spring up for several reasons - among them, the destruction of trees and grasslands brought about by development and the thermal pollution from car and truck engine exhaust. But the single largest cause of the proliferation of urban heat islands is the use of dark-colored paving materials such as asphalt for roads and parking lots, and dark-colored roof coverings. That's because darker surfaces like asphalt absorb more heat than lighter surfaces like concrete. By contrast, lighter surfaces reflect more heat.

URBAN HEAT ISLANDS

of the most common and inexpensive raw materials on Earth. Although the initial cost for constructing a conventional concrete parking lot can be higher (approx. 5-15% more depending on design specifics), concrete easily lasts twice as long as asphalt.

Obviously, the story of urban heat islands and global warming is complex, so we've included a list of references on the back cover of this brochure, and we suggest you start there. Also, the Internet is filled with web sites that examine global warming, urban heat islands and heat island research and remedies. The more you learn - and the sooner you learn it - the easier it will be for you to lend an informed voice to the effort to turn down the heat.

e of the techniques that can
n to be found, and there are

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of Portland Cement Concrete and Asphalt
nent," *Portland Cement Association R&D*

A Decision Support Information System
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Luvall, "Application of high-resolution
sensing and GIS to assess the urban
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l Geographer, Vol. 43, No. 1, 1991.

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Through Urban Heat Island Mitigation:
Heat Island Pilot Project."

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Harvard Business Review; *What Every Executive Needs to Know About Global Warming,* Packard, K.O. and R. Reinhardt, July-August 2000.

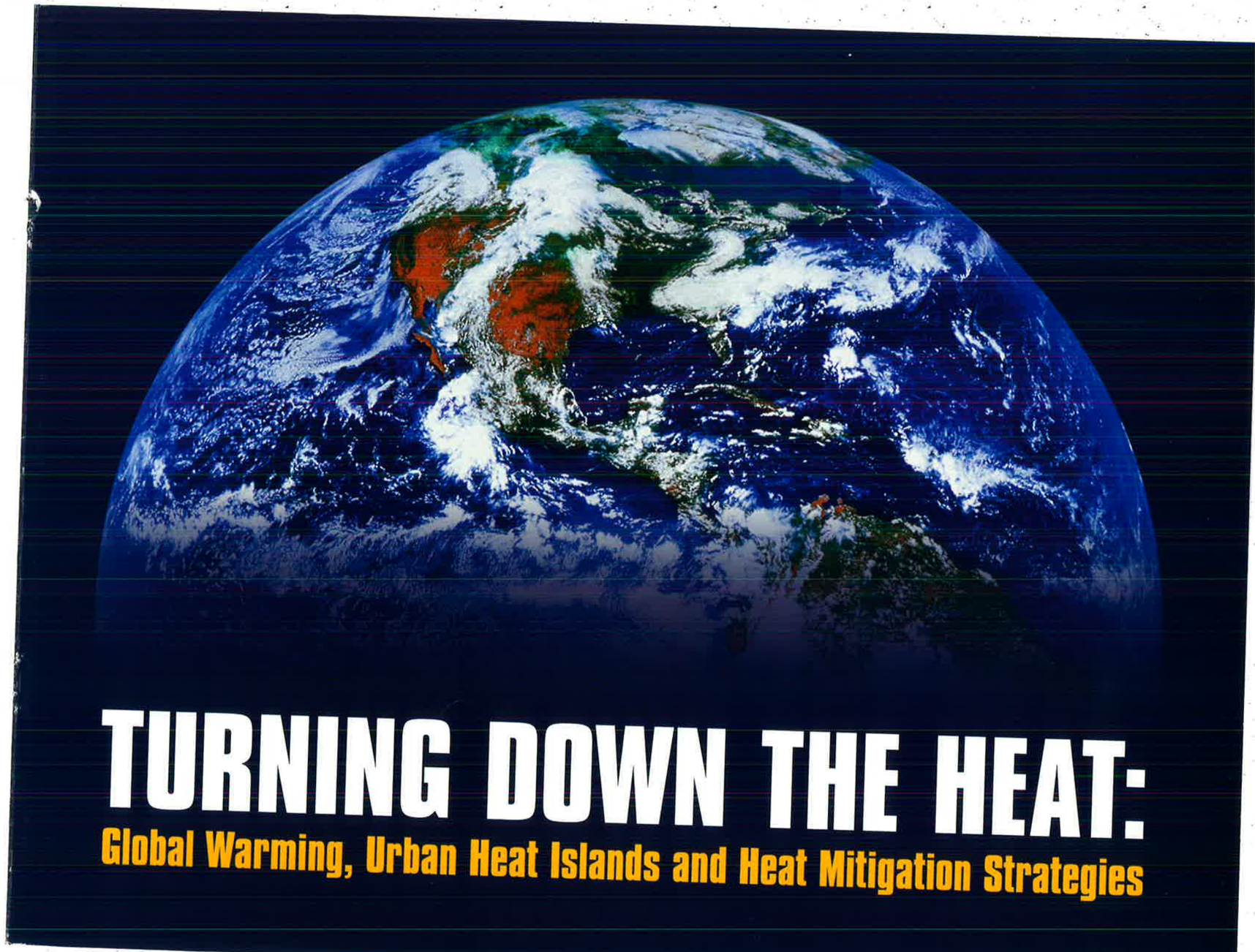
GeoInfo Systems; *Assessing The Impacts of Atlanta's Growth on Meteorology and Air Quality Using Remote Sensing and G.I.S.,* Quattrochi, D.A. and J.C. Luvall, May 1999.

American City & County; *Putting the Freeze on Heat Islands,* Wade, B., February 2000.

USA Today; Arlington; *Parking: A lot of hazards on the asphalt,* Watson, T., May 1999.

USA Today; Chicago; *Sweaty cities learn natural ways to chill out,* Johnson, K.V., June 1999.

Environmental News Network; *Team probes Atlanta heat island,* March 1999.



TURNING DOWN THE HEAT:

Global Warming, Urban Heat Islands and Heat Mitigation Strategies

FLORIDA CONCRETE & PRODUCTS ASSOCIATION, INC.
AGGREGATE • CEMENT • MASONRY • PIPE • READY MIX

1-800-342-0080 (In Florida)
407-895-9333

FC&PA Concrete Parking Area Partnering Program

Certified Finishers

The following is a list of concrete contractors in the state of Florida that have earned "Certified Parking Area Finisher" status in accordance with the Florida Concrete & Products Association's Partnering Program. To qualify as an FC&PA Partner, a *company* must have at least one current employee certified either through FC&PA's Parking Area Finisher Certification workshop or through ACI's Flatwork Finisher program. To qualify as an FC&PA Certified Finisher, an *individual person* must have at least three years of experience in placing and finishing concrete pavement and hold either the FC&PA or ACI certification. (FC&PA honors ACI's certification.)

Quality Construction Checklist

To ensure quality concrete construction for durable and long-term performing pavements, the FC&PA recommends a Pre-Placement Meeting with all parties involved. During this meeting, it is important to verify that the individual who will oversee and direct the placing and finishing operations be present on the job and be a Certified Finisher. A 70-Point Checklist for the Pre-Placement Meeting is available at no charge through the FC&PA by calling 407-895-9333 or 1-800-342-0080. Ask for Form #577.

Aagaard General Contracting, Inc.
Dennis Aagaard
Certification No.: PAF-01
319 Elm Avenue
Sanford, FL 32771
(407) 330-2101

Advanced Building Constructors
Daniel Lewis
Certification No.: PAF-08
Greg Norris
Certification No.: PAF-10
8150 Presidents Drive
Orlando, FL 32809
(407) 855-9109

Advanced Site & Paving
Bruce Glaspey
Certification No.: PAF-05
1971B Corporate Square Drive
Longwood, FL 32750
(407) 260-1444

Birdwell Builders and Associates
Bryan Birdwell
Certification No.: PAF-03
PO Box 90664
Lakeland, FL 33804
(863) 709-9401

Bolognese Concrete
Dan Bolognese
Certification No.: PAF-31
John Ludwig
Certification No.: PAF-32
10915 Bonita Beach Road
Suite 1121
Bonita Springs, FL 34135
(941) 949-1551

Concrete Warriors, Inc.
Lawrence Whaley
Certification No.: PAF-29
4509 Bee Ridge Road, Ste B
Sarasota, FL 34233
(941) 650-4818

Contech Construction Corp.
Jon Blanchard
Certification No.: PAF-04
11548 Delmar Avenue
Orlando, FL 32836
(407) 909-0278

Curbco
Daryl Harris
Certification No.: PAF-17
Bryan Kersey
Certification No.: PAF-20
Charles Kersey
Certification No.: PAF-21
Jeremy Kersey
Certification No.: PAF-22
8008 34th Avenue North
Bradenton, FL 34202
(941) 747-4848

Curb Systems
Brian French
Certification No.: PAF-34
William Scott
Certification No.: PAF-35
10964 K-Nine Drive
Naples, FL 34135
(941) 947-3777

Dan Baker Concrete
Don Baker
Certification No.: PAF-14
2128 West Hibiscus Road
Avon Park, FL 33825
(863) 452-0494

Daniel Morgan Concrete
Harold Moore
Certification No.: PAF-09
1603 S. Bumby Ave.
Orlando, FL 32806
(407) 895-6676

Don Bo, Inc.
Mark Robinson
Certification No.: PAF-11
2835 Kirby Ave., #101
Palm Bay, FL 32905
(321) 768-2287

GL Bradford Concrete Placing
Hector Bertran
Certification No.: PAF-02
Gary Bradford
Certification No.: PAF-12
1904 Monti Carlo Trail
Orlando, FL 32805
(407) 893-1891

John McCellan
John McCellan
Certification No.: PAF-26
2170 Oleander Drive
Avon Park, FL 33825
(863) 449-0194

Johnson Concrete Services, Inc.
Mike Johnson
Certification No.: PAF-18
Kevin Porter
Certification No.: PAF-27
Billy Scarbrough
Certification No.: PAF-28
1884 Country Meadows Drive
Sarasota, FL 34235
(941) 374-4465

Kopta Construction
Darren Kopta
Certification No.: PAF- 23
52 North Palmetto Creek Road
Avon Park, FL 33825
(863) 453-4217

Kustom Concrete of Central Florida
Barbara Harris
Certification No.: PAF-07
Alvin Long
Certification No.: PAF-13
24865 CR 42
Paisley, FL 32767
(352) 669-6672

Lovin Construction
Tonie Lovin
Certification No.: PAF-24
PO Box 20575
Bradenton, FL 34204
(941) 755-4312

McLeod Services
Peter Kenney
Certification No.: PAF-19
PO Box 5848
Sarasota, FL 34277
(941) 922-1861

Murray's Designer Concrete
Murray Martin
Certification No.: PAF-25
5105 Erie Road
Parrish, FL 34219
(941) 729-0830

R.A. Jensen, Inc.
Rick Jensen
Certification No.: PAF-30
205 S.E. 9th Terrace
Cape Coral, FL 33990
(941) 574-4914

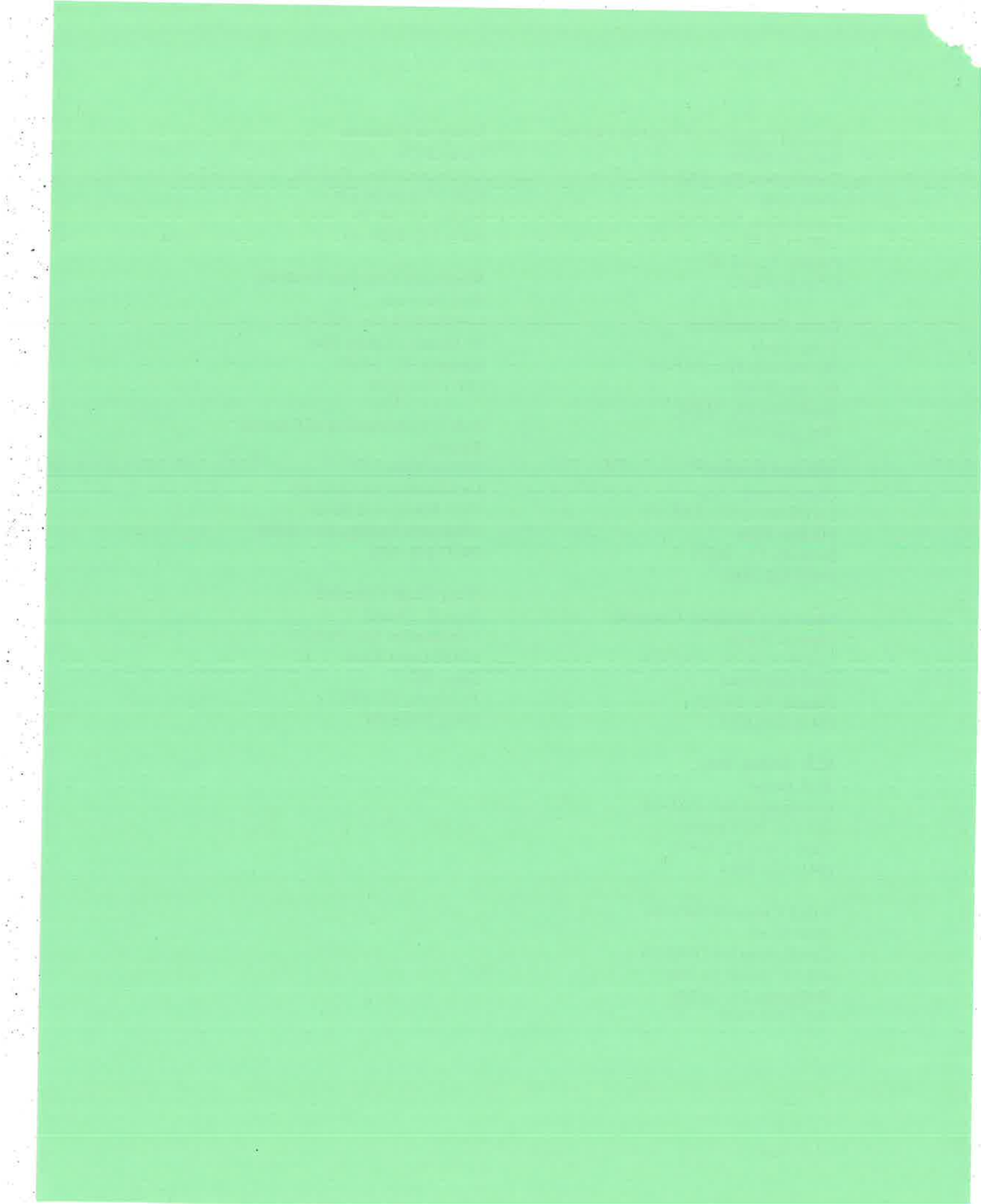
S & F Concrete Services
Dale Flynn
Certification No.: PAF-16
403 74th Street Ct. NW
Bradenton, FL 34209
(941) 794-5789

Seminole Concrete
Corey Billie
Certification No.: PAF-36
4231 5th Avenue SW
Naples, FL 34119
(941) 352-8828

Singletary Concrete Products
Rick Dextraze
Certification No.: PAF-15
59 Sarasota Center Blvd.
Sarasota, FL 34240
(941) 378-8800

T & T Construction of Central Florida
Marcus Goss
Certification No.: PAF-06
1057 Blackwood Street
Altamonte Springs, FL 32701
(407) 948-4991

West Coast Concrete
Sean St. Amand
Certification No.: PAF-33
16880 Gator Road
Suite 107
Ft. Myers, FL 33912
(941) 590-6408



Parking Lot CEU Classes

1 **CONSTRUCTION OF PORTLAND CEMENT-PERVIOUS PAVEMENT**

Source	ID	Type	# Unit	Expiration	Renewal	Application
University of Florida	020325-018	CEU	0.1	06/30/2002	08/13/2001	
AIA	0G007	LU	1.0	Never Expires		
AR Board	AR.08.649	CEU	1.0	02/16/2003	02/16/2001	
CILB	0040000453	CEU	1.0	04/01/2002	Waiting for Diep	

2 **COMPUTERIZED DESIGN & SERVICE LIFE COST OF PARKING LOTS**

Source	ID	Type	# Unit	Expiration	Renewal	Application
University of Florida	020325-017	CEU	0.1	02/28/2003	08/13/2001	
AIA	0G006	LU	1.0	Never Expires		
AR Board	AR.12.557	CEU	1.0	02/28/2003	02/16/2001	
CILB	0040005601	CEU	1.0	04/01/2003		

3 **CONCRETE PARKING LOTS**

Source	ID	Type	# Unit	Expiration	Renewal	Application
University of Florida	020325-016	CEU	0.2		08/13/2001	
AIA	0G0005	LU	2.0	Never Expires		
AR Board	AR.08.558	CEU	2.0	Exp: 2/28/03	Ren: 2/16/01	
CILB	40005603	CEU	2.0	Exp: 4/03		

4 **PARKING AREA FINISHER**

Source	ID	Type	# Unit	Expiration	Renewal	Application
CILB	40005845	CEU	8.0	05/03/2002		

5

PARKING LOT DESIGN SEMINAR

Source	ID	Type	# Unit	Expiration	Renewal	Application
University of Florida	Not issued, app pending	CEU	0.6			12/05/2001
AIA	0G006	LU	6.0	Never Expires		12/05/2001
AR Board	Not issued, app pending	CEU	6.0			12/05/2001
CILB	Not issued, app pending	CEU	6.0			12/05/2001

6

GUIDELINES TO DESIGNING AN ENVIRONMENTALLY SOUND CONCRETE PARKING LOT

Source	ID	Type	# Unit	Expiration	Renewal	Application
University of Florida	Not issued, app pending	CEU	0.2			01/03/2002
AIA	H022-12	LU	2.0	Never Expires		01/03/2002
AR Board	Not issued, app pending	CEU	2.0			01/03/2002
CILB	Not issued, app pending	CEU	2.0			01/03/2002

7

ENVIRONMENTAL STRATEGIES FOR SUSTAINABLE DESIGN OF CONCRETE PARKING LOTS

Source	ID	Type	# Unit	Expiration	Renewal	Application
University of Florida	Not issued, app pending	CEU	0.1			01/03/2002
AIA	H022-13	LU	1.0	Never Expires		01/03/2002
AR Board	Not issued, app pending	CEU	1.0			01/03/2002
CILB	Not issued, app pending	CEU	1.0			01/03/2002

8

QUALITY CONCRETE IN THE 21ST CENTURY- AN INDUSTRY OVERVIEW

Source	ID	Type	# Unit	Expiration	Renewal	Application
CILB	40000448	CEU	8.0	05/01/2002		

9 **QUALITY CONCRETE IN THE 21ST CENTURY- CONCRETE CRACKING**

Source	ID	Type	# Unit	Expiration	Renewal	Application
CILB	40000451	CEU	1.0	05/01/2002		

10 **QUALITY CONCRETE IN THE 21ST CENTURY- MIX DESIGNS**

Source	ID	Type	# Unit	Expiration	Renewal	Application
CILB	40000449	CEU	1.0	05/01/2002		

11 **QUALITY CONCRETE IN THE 21ST CENTURY- PLACING & FINISHING**

Source	ID	Type	# Unit	Expiration	Renewal	Application
CILB	40000450	CEU	1.0	05/01/2002		

12 **PERVIOUS CONCRETE PAVING SEMINAR**

Source	ID	Type	# Unit	Expiration	Renewal	Application
University of Florida	Not issued, app pending	CEU	0.6			01/21/2002
AIA	H022-14	LU	6.0	Never Expires		01/21/2002
AR Board	Not issued, app pending	CEU	6.0			01/21/2002
CILB	Not issued, app pending	CEU	6.0			01/21/2002

#002319
1/28/02

GAINESVILLE'S FIRST CONCRETE STREET

Project Information

- Location: SW 3rd Street – S. of Depot Ave. (Access to FL Rock Concrete Plant)
- Length: 450 ft.
- Area: Concrete Plant, Recycling Facility & Towing Company
- Traffic: Concrete Truck Mixers and Other Heavy Trucks.

DESIGN

- Asphalt Alternate:
  - 2.5 in Asphalt
  - 8" Limerock Base
  - 12" Stabilized Subgrade
- Concrete Alternate:
  - 8 in Concrete Pavement
  - Compacted existing soil.

Concrete Pavement Design

- Thickness: 8 in
- Lanes: (2) 14 ft. wide lanes
- Joint spacing: 15 ft.
- Joint Info.: Dowel Bars at Transverse Joints. Tie Bars Between Lanes.
- Joint sealant: Silicon
- Concrete : Steel & Nylon Fibers were used
  - Required Fc'- 3000 psi
  - Actual Fc' - 6300 psi


DEAD
END


PROJECT PARTNERS
CEMEX
Advanced Concrete
Finishing
LAMBERT

A better choice for the environment... every step of the way

It's as old as the Romans . . . but it's also as current as today's concerns about saving energy, helping the environment and using our resources wisely.

It's concrete —a simple mixture of readily available ingredients. This remarkable material is absolutely vital to our society, and is used literally everywhere—from roads and sidewalks to homes and larger buildings.

You probably already know that concrete offers exceptional stability, durability and design flexibility. But you may not realize how many important environmental advantages it offers through every stage of manufacturing and use. And because old concrete can be recycled, the cycle can continue indefinitely.

In fact, concrete is one of the single most environmentally friendly construction products currently available. Here are just a few of the reasons:

The Environmental Council of Concrete Organizations — ECCO

Members of the Environmental Council of Concrete Organizations are dedicated to improving the quality of the environment by working to increase awareness of the environmental aspects and benefits of concrete and concrete products.

Simply put, the concrete industry wants to spread the news that concrete is one of the single most environmentally friendly construction products currently available.

Membership in ECCO enables you to help us produce the programs and materials needed to fully tell the environmental story of concrete. If you'd like to learn more about ECCO, simply call 1-800-994-ECCO (3226) or write to us at:

ECCO
5420 Old Orchard Road
Skokie, Illinois 60077-1083

Help us spread the word about concrete and the environment.

ENVIRONMENTAL COUNCIL *of*
CONCRETE ORGANIZATIONS

A Concrete Advantage

The surprising environmental benefits of concrete

ENVIRONMENTAL COUNCIL *of*
CONCRETE ORGANIZATIONS

Natural and recycled materials

Unlike building materials that rely on scarce or non-renewable resources, concrete is made from three abundant, readily available ingredients:

- Water
- Aggregate (stone, sand and gravel)
- Portland cement (a fine gray powder made from abundant natural materials)

A growing list of recycled materials supplements these three basic ingredients. In addition to stone, sand and gravel, aggregate may contain some recycled waste materials, such as slag, a waste product of steel-making. And part of the portland cement can be replaced by other wastes such as fly ash, a residue left over from coal-burning power plants.

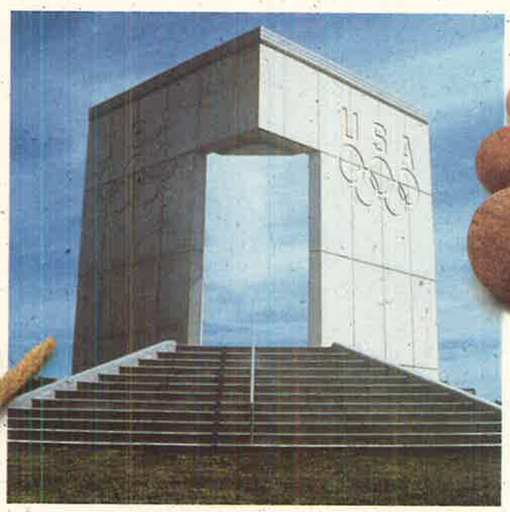
Even the actual process of making cement uses recycled materials. High-energy wastes such as old tires can be safely recycled as fuel for the cement-making process. Each year, a single cement kiln can recycle one million tires, conserving fossil fuels and placing less demand on landfill space.

Concrete is made from abundant, readily available ingredients, not scarce resources.

Lasting benefits

When you consider that concrete is strong, adaptable and resistant to fire, water and weather, there's little wonder it has a longer service life than wood, steel, asphalt and other construction products.

Concrete's durability conserves resources by reducing maintenance and the need for reconstruction. And at the end of its initial service life, concrete can be crushed and reused as aggregate for new concrete, continuing the cycle of environmental benefits.



Outstanding resistance to fire, water and weather contributes to concrete's long service life.

Energy efficient

The thermal mass of concrete buildings saves energy year-round by reducing temperature swings. During the cooling season, the building will require cooling mainly at night—an off-peak time when electric companies can produce power more efficiently and conserve fossil fuels.

During the heating season, a concrete building will cost less to heat than a comparable structure made of different materials. And these benefits last as long as the building itself—which in the case of concrete structures is a very long time.

Landscaping in this attractive yard includes environmentally friendly concrete.

choose concrete

50% more light reflective

According to NASA researchers, concrete has a significantly higher reflectivity than other pavements. As a consequence, concrete is substantially cooler.

longer life

Concrete is resource efficient, energy efficient, recyclable and offers twice the life. It's also made with common and inexpensive raw materials.

70°F cooler

According to the Lawrence Berkeley National Laboratory, concrete pavements are as much as 70°F cooler than other pavements. Cooler is better because heat initiates harmful ground-level ozone.

cool communities product of choice

Cool Communities is an innovative, cost-effective and sustainable design strategy to improve air quality and reduce energy costs. Concrete products help to mitigate heat and smog.

save more than money.

Call today to receive a free Fact Book about why concrete makes environmental and economic sense for your next parking lot or road paving project.

1-800-342-0080 • Outside Florida call 407-895-9333

unfortunately they're right.

Black asphalt pavements are red hot – reaching temperatures of 195°F in the summer sun. Radiant heat from asphalt roads and parking lots turns cities into "heat islands" that average 6-12°F hotter than surrounding rural areas. NASA and EPA studies indicate the health risk from heat-related air pollution is approaching crisis proportions in many cities.

Concrete is a cooler way to pave. Light-reflective concrete can help reduce pavement surface temperatures by as much as 40-70°F, helping keep our environment cooler and improving air quality. And since concrete typically lasts more than twice as long as asphalt, we'll all feel the benefits for years to come.

Call today to receive a free Fact Book about why concrete makes environmental and economic sense for your next parking lot or road paving project.

choose concrete

more than money.

1-800-342-0080
Outside Florida call 407-895-9333

cool communities

Cool Communities is a nonprofit action-oriented advocacy program aimed at improving air and water quality and conserving energy by promoting the use of lighter, reflective (high albedo) roofing and paving materials in combination with strategically planted shade trees as a desirable design "system." In Georgia, Cool Communities has formed a coalition of public and private organizations to support efforts to reduce the effects of the urban heat island.

Nationally, American Forests, a nonprofit conservation organization, coordinates the Cool Communities program, which is sponsored by the U.S. Department of Energy.

The U.S. Environmental Protection Agency, USDA and other agencies provide additional federal support. Each local "Cool Community" is responsible for its own funding, generally through grants, contributions and foundation support.

For information on how to make your community a "Cool Community," please contact:

Cool Communities Coordinator
American Forests
P. O. Box 2000
Washington, DC 20013
Phone: 202-955-4500

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Georgia Cool Communities Steering Committee

Georgia Environmental Protection Division
Georgia Power Company
Metropolitan Atlanta Chamber of Commerce
Resource Communications Consultants
Trees Atlanta
Urban Land Institute

Advisory Board

City of Atlanta Bureau of Planning
Fulton County Environmental Affairs
Georgia Concrete and Products Association
Georgia Department of Community Affairs
Georgia Forestry Commission
Georgia Pollution Prevention Assistance Division
Georgia State University, Physical Plant Department
Georgia Tech Center for Urban and Regional Ecology
Greater Atlanta Community Corps
NASA Global Hydrology and Climate Center
National Park Service
Southeast Cement Promotions
Southface Energy Institute
USDA Forest Service
U.S. Department of Energy
U.S. Environmental Protection Agency, Policy and Analysis Branch

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Don't Turn Up The Heat!

Cool Communities offers strategies for lowering energy costs and keeping our city cool.

Everyone talks about the weather. Maybe you can do something about it.

- Hot roofs, reaching up to 150 degrees, heat the surrounding air as well as the building.
- Hot pavement reaches 195 degrees and cooks surface contaminants in storm-water runoff.
- Hot streets and parking lots with no shade trees create urban heat islands.
- Hot air cooks the atmosphere and produces smog.
- It's too hot to walk to the store, so we take the car and crank up the air conditioning.
- Parked cars on hot lots emit polluting fumes from their gas tanks.
- Our homes and offices are too hot so we use more air conditioning.
- Rains can't soak into impervious pavement, so they wash over the hot surface and dump hot contaminated water into streams.
- Business centers are 10 degrees hotter than the countryside and we're baking under layers of smog.

"Cool Communities" is an innovative, cost-effective sustainable design strategy to improve air and water quality and reduce energy costs for cooling.

cool communities

Lighten Up - Cool Down

Heat is often overlooked in air quality improvement measures. Cities are 6 to 10 degrees warmer than the surrounding countryside. As man-made structures replace trees and meadows, expanses of asphalt and concrete absorb heat, lead to higher temperatures and contribute to poor air quality. Heat accelerates ozone formation and increases demand for air conditioning (indirectly creating more emissions from power generation.) "Cool Communities" strategies combine reflective roofing, porous paving and strategically placed trees to provide simple, cost-effective ways to lower summer air temperatures.

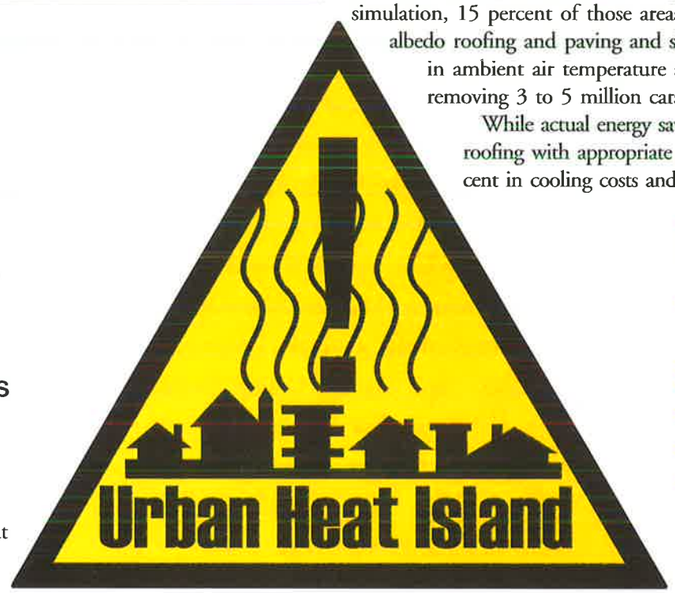
Paving with porous materials:

- reduces storm-water runoff
- replenishes groundwater
- reduces flooding and loading to sewage treatment plants
- means less land set aside for retention basins
- reduces pollutants in run-off
- reduces irrigation requirements
- cools water run-off temperatures
- lessens evaporative emissions from parked cars

Parking lots are major contributors to urban heat islands. On summer days, an asphalt lot can reach 195 degrees. Rain falling onto a parking lot in the summer can warm to 90 degrees before flowing into waterways where it harms temperature-sensitive species. The runoff also carries toxic pollutants. Parked cars on hot pavement emit gas fumes that contribute to air pollution. While alternative surfaces with higher reflectivity are available, cost, durability, strength and maintenance requirements are often unsatisfactory.

Porous paving offers a solution for low traffic areas such as parking lots, access roads and bike paths. Unlike traditional concrete or asphalt, porous pavements typically provide a void content of 15 to 25 percent, offering improved filtration and increased surface area to catch oils and chemical pollutants. Light colored material can be used to give the pavement greater reflectivity. In addition, the open void structure allows cooler earth temperatures from below to cool the pavement.

Studies indicate that the strength and durability of porous pavement are equal to traditional materials. It is also less susceptible to freeze-thaw cracking due to the large void spaces. The material's cooler surface, its ability to retain storm water, its positive effects on water quality and plant growth make it an exciting example of green and sustainable building practices.



Cool Communities Sustainable Design "System"

Using these three measures as a "system" greatly increases the effectiveness of heat island mitigation. Planners, designers and other decision-makers can employ these strategies to improve air and water quality, reduce storm-water runoff, and incorporate *cost-effective and innovative approaches to pollution prevention.*

- They are *voluntary.*
- They *do not require behavioral changes.*
- They can be implemented *for new development* as well as *retro-fitting* and *normal maintenance cycles.*
- They *reduce energy costs.*
- They create *more pleasant urban environments.*

Installing reflective roofing:

- lowers exterior and interior temperatures
- reduces energy costs for air conditioning
- reduces electric power generation and associated emissions

The roofs of structures such as shopping malls, warehouses and office buildings can reach 150 degrees in the summer, enough to affect whole neighborhoods. Using surfaces with high albedo (a measure of the reflectivity of solar radiation) for roofing and pavement can reduce the ambient air temperature so that the entire area is cooler.

A computer model for Los Angeles done by Lawrence Berkeley National Laboratories identified the city's "heat sinks" — pockets of heat indicated by infrared satellite imagery. In simulation, 15 percent of those areas adopted cool communities strategies, using high albedo roofing and paving and shade trees. The result was a 6 degree F reduction in ambient air temperature and a 12 percent reduction in smog (the equivalent of removing 3 to 5 million cars from the road.)

While actual energy saving depends on many variables, the use of high-albedo roofing with appropriate insulation can result in a savings of as much as 50 percent in cooling costs and a reduction in peak cooling demand of 10 to 15 percent.

Planting urban shade trees:

- cools the air through evapo-transpiration
- reduces air conditioning requirements
- filters particulate matter
- controls erosion
- reduces storm-water runoff

Research by NASA scientists, the University of Georgia, American Forests and others shows that the 13-county metro Atlanta area lost about 190,000 acres of tree canopy from 1988 to 1998 (about 50 acres per day.). As a result, metropolitan urban heat islands are growing larger and hotter, as much as 12 degrees hotter than the surrounding areas. Lawrence Berkeley National Laboratories's studies show that for each 1 degree Fahrenheit rise in summer temperature, the risk of smog formation increases by 3 percent or more.

Trees and other plants cool air temperature through evapo-transpiration and slow the movement of storm water, lower total runoff volume, reduce flooding and control erosion. By providing shade, strategically placed trees can reduce energy costs for cooling and lessen the negative effects of heat-absorbing parking lots.