



Division of Energy, Mineral and Land Resources

**LID and Other Stormwater Updates
Sediment-Erosion Control Workshop
Spring 2014**

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NC Division of Energy, Mineral and Land Resources
Stormwater Program



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- Low Impact Development & Storm-EZ
- BMP manual updates
- Technical Review Workgroup Products
- Minimum Design Criteria Team
- Gravel




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Wooded Lot



Parking Lot



Most the rain soaks in

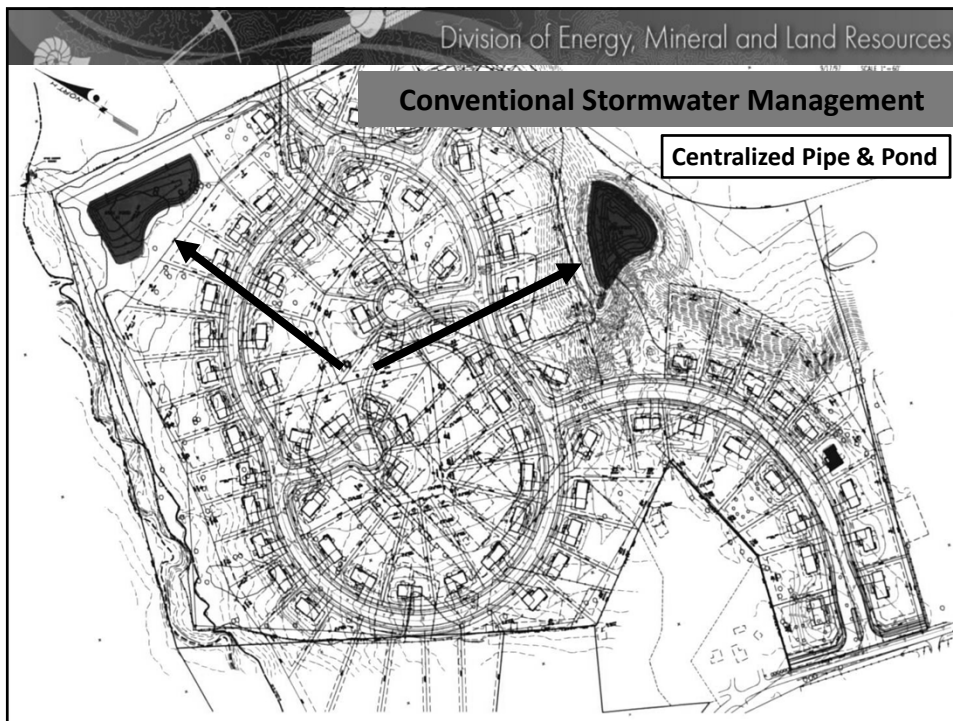
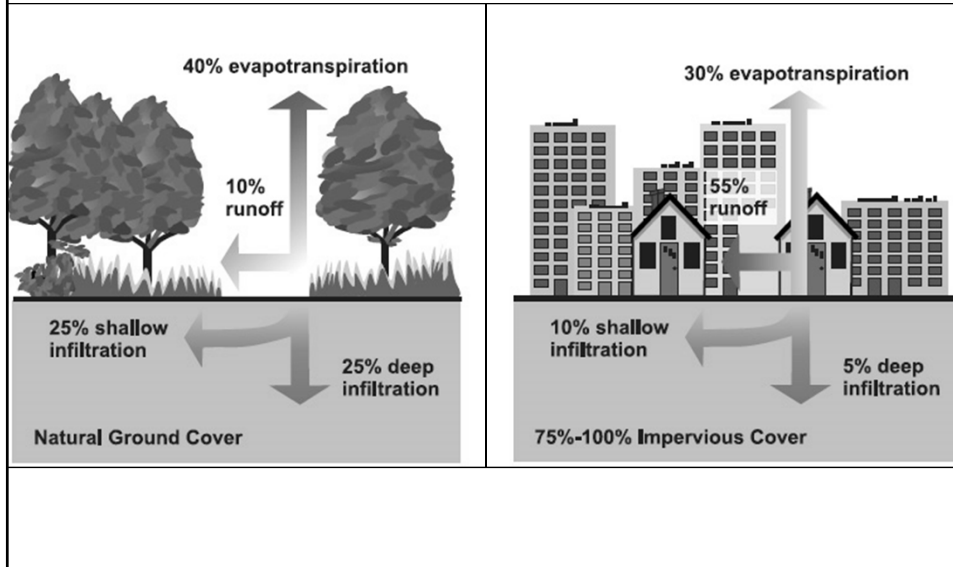
Runoff





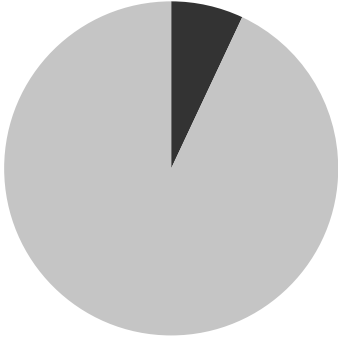
Most the rain runs off

Cumulative Impact...



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Conventional Stormwater Management



■ Infiltration, Evapotranspiration, and Evaporation
■ Treated Runoff


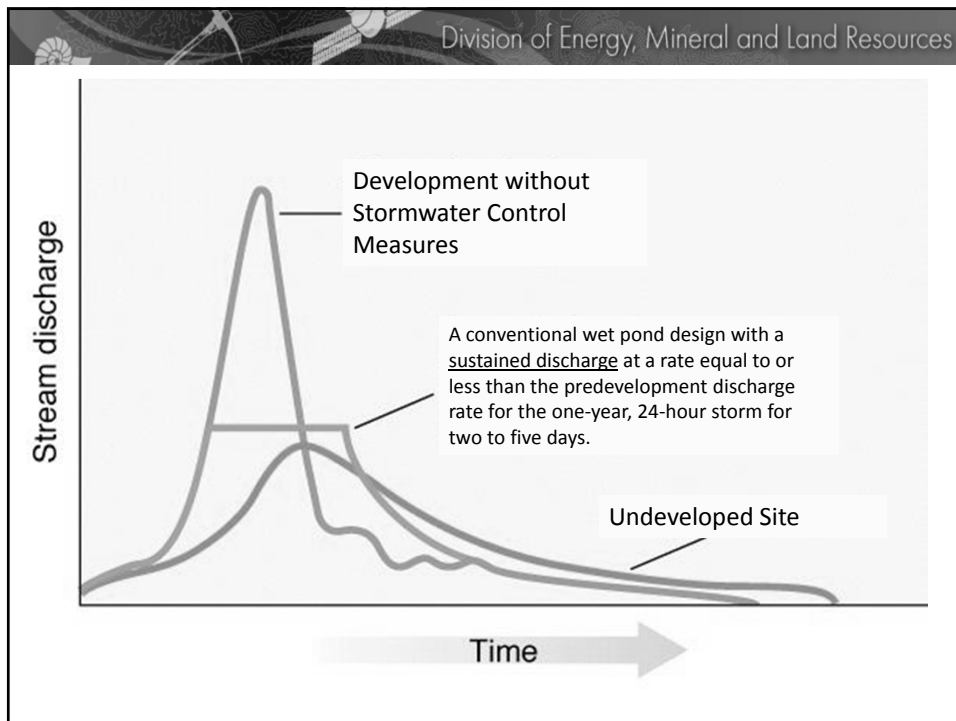
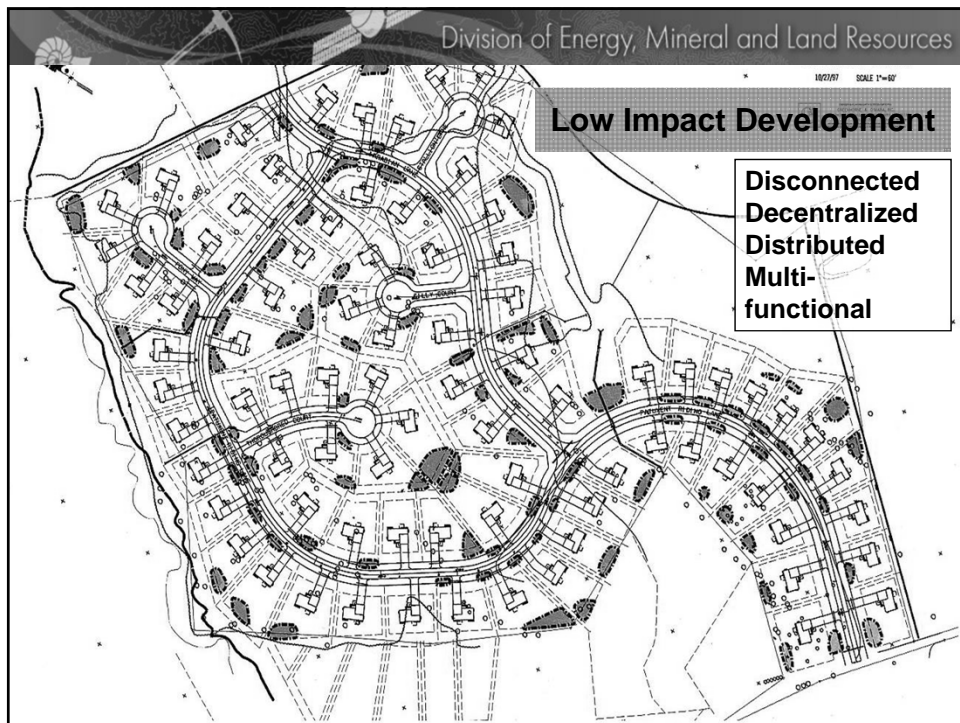
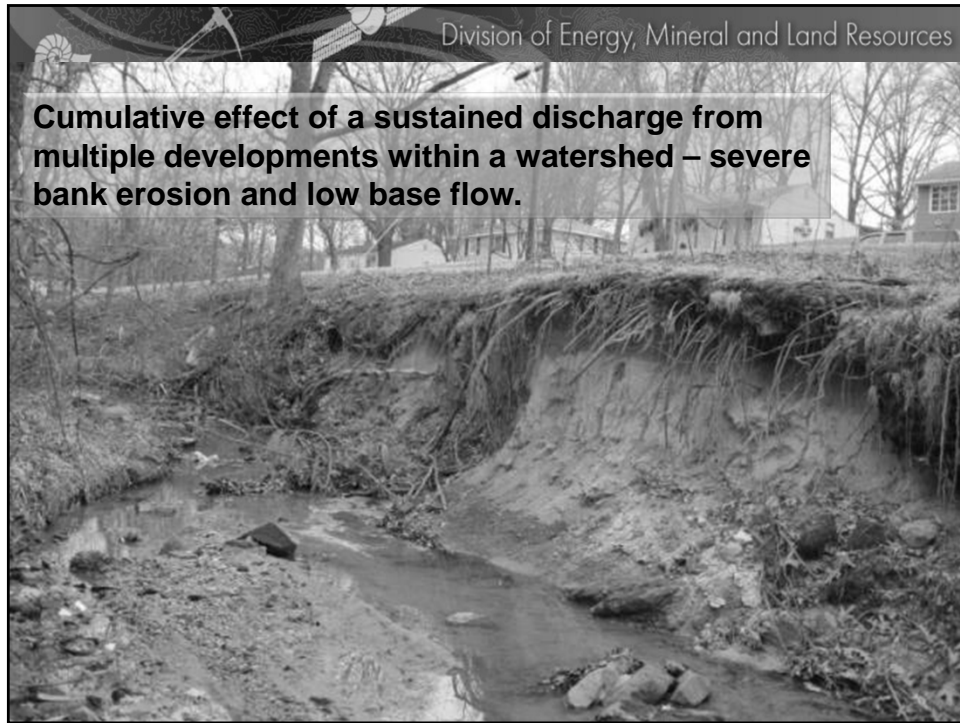


Photo: NCSU-BAE

- Capture and convey stormwater from the site to one or two BMPs
- Conveys water quickly
- Effective for flood control
- Cost effective as regional control devices and for retrofits
- Widely used and accepted in NC





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Wooded Lot



Most the rain soaks in

Runoff 

Low Impact Development



LID utilizes the natural landscape, open space, and tree cover to slow rainwater and soak up it up, preventing polluted runoff from reaching surface waters.

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Why treat stormwater runoff if you can eliminate it?




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Technical Review Team

Withers & Ravenel
Red Line Engineering
Estes Design Group
Morrisville, Raleigh, Greensboro, Charlotte
NCSU Stormwater Group
UNC-Chapel Hill
Coastal Federation
American Rivers
Division of Water Resources
DEMLR

Division of Energy, Mineral and Land Resources


State Technical Review Team



North Carolina
Division of Water Quality

**Stormwater
Best Management
Practices
Manual**

July 2007*


NCDENR

*Individual chapters of the BMP Manual will be updated periodically. Individual chapters may be more recent than July 2007.

BMP Manual

- Overland Flow
- Disconnected BUA
- Soil Amendments
- Rainwater Harvesting
- Blue and Green Roofs
- Bioretention
- Infiltration Swales

Expanding the number of stormwater management controls that developers may choose to use on their sites

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BMP Manual Updates:

Disconnected Impervious Surface (DIS) Rainwater Harvesting Green Roof




Photo: NCSU Stormwater Group

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Disconnected Impervious Surface (DIS): (new chapter)

- Two types:
 - Downspout disconnection
 - Pavement disconnection
- Can achieve a range of credit based on the design and soil type.



Photos: NCSU Stormwater Group

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Downspout Disconnection

- 500 square feet max to downspout.
- 7% max slope with uniform grading.
- Dense lawn with no clumping species.
- Minimum 5-foot distance between foundation & vegetated area.
- Sites must be tilled to eight inches prior to vegetation establishment.

Photo: Natalie Carmen, NCSU


Image: Andrew Anderson, NCSU

Photo: Natalie Carmen, NCSU

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Downspout Disconnection

Minimum size	6' wide X 12' long		12' wide X 24' long	
HSG	A/B	C/D	A/B	C/D
Runoff reduction credit	45%	30%	65%	50%



Photos: Natalie Carmen, NCSU

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Pavement Disconnection

- Maximum of 100 feet to a 10-foot grassed shoulder.
- Gravel or specialized curb slightly lower than road surface to promote drainage and protect pavement edge.
- Maximum slope of 8% for both pavement and shoulder (graded to promote diffuse flow).


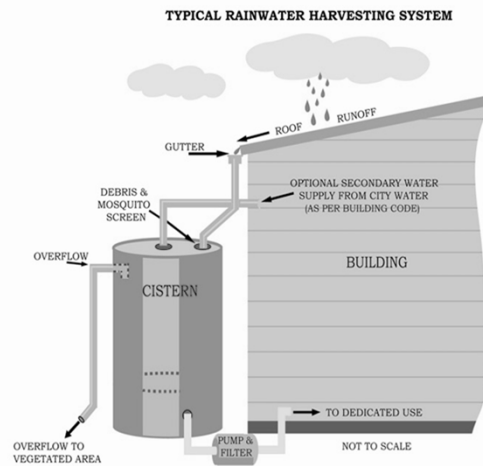


Photo: NCSU Stormwater Group

Rainwater Harvesting

- Full 85% TSS reduction
- Rule of thumb: 1 gallon/square foot of roof
- New passive drawdown design to a vegetated area for a SF lot or small infiltration or bioretention for other sites
- Also may have a dedicated use



Green Roof

- 85% TSS removal if designed to control the entire design storm
- Credit is based on the depth and plant available water in growing medium





Photos: NCSU Stormwater Group

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Bioretention

- Promote infiltration via soil prep
- Credits for bioretention and other stormwater infiltration practices will be based soil types



Inexpensive
upturned under
drains

Photos: NCSU-BAE

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Pervious Surface



Pervious Surface

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Infiltration Piping

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OR

WITHERS & RAVENEL

ENGINEERS | PLANNERS | SURVEYORS


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Storm EZ and LID meets all existing State stormwater programs


Storm EZ and LID meets Section 438 of the Energy Independence and Security Act - Federal facilities shall maintain or restore the predevelopment hydrology.

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NC STATE UNIVERSITY
College of Agriculture and Life Sciences | College of Engineering



Stormwater Engineering Group



Low Impact Development & Storm-EZ Technical Workshops

Attend the NCSU-BAE LID & Storm-EZ workshops.

May 7-8, 2014 – Boone, NC

May 14-15, 2014 - Raleigh, NC

May 21-22, 2014 - Wilmington, NC

More on the horizon – check the NCSU web site.

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HOME Search DENR ... Text +

[Back to Stormwater Permitting Homepage](#)

BMP Manual Errata Sheet
Revised 12/5/12

BMP Manual Chapters

Cover Page

1 - Introduction r. 7/2/07

2 - NC Stormwater Requirements r. 6/6/09

3 - Stormwater Calculations r. 6/16/09

4 - Selecting the Right BMP r. 12/5/12

5 - Common BMP Elements r. 7/16/09

6 - Landscape & Soil Specs. r. 6/17/09

7 - BMP Maintenance r. 9/28/07

8 - Level Spreader & Veg. Filter Strip r. 3/9/10

9 - Stormwater Wetland r. 7/10/09

10 - Wet Detention Basin r. 6/16/09

11 - Sand Filter r. 9/20/09

12 - Bioretention r. 7/24/09

13 - Public Airports BMP Toolbox DRAFT

14 - Grassed Swale r. 6/8/09

15 - Restored Riparian Buffer r. 9/28/07

16 - Infiltration Devices r. 7/23/09

17 - Dry Detention Basin r. 6/1/09

18 - Permeable Pavement r. 10/16/12

19 - Rooftop Runoff Mgmt r. 9/28/07

20 - Proprietary Systems r. 12/5/12

21 - BMP Const. Techniques r. 7/2/07

22 - SW Submittal Requirements r. 7/2/07

23 - References r. 7/2/07

Appendix A r. 1/22/14

Appendix B r. 7/2/07

Appendix C r. 7/2/07

DWQ Stormwater BMP Manual & BMP Forms

January 22, 2014: Several links in this section are not working as we sort out a website transition issue. We apologize for the interruption, and we are working to correct the problem as soon as possible. Please check back or call a Stormwater Permitting Staff member for assistance. Select from the menu on the left the BMP Chapter, BMP Supplement Form or OBM Agreement that you want to view.

All other forms and documents related to State Stormwater and Post-Construction can be found [HERE](#).

Sign up to receive BMP email updates: [CLICK HERE](#)

[COMMENT ON THE BMP MANUAL & RELATED FORMS](#)

North Carolina
Division of Water Quality

**Stormwater
Best Management
Practices
Manual**

Stormwater BMP Manual Updates
View our public notice on April 1, 2014

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Technical Review Workgroup

- Met from January 2013 to January 2014, usually in Wilmington.
- Included consultants, environmental group, local government, DEMLR and DWR.
- Addressed some specific concerns about the stormwater program.

Technical Review Group Products:

1. Discrete SCS Method for Computing WQV
2. Standards for Relaxing the 2-foot Separation from SHWT for Infiltration Devices
3. Options for No Direct Discharge to SA Waters
4. Definitions of Key Stormwater Terms
5. Alternative Design for Wet Detention Ponds
Will be conveyed to the MDC Team

Minimum Design Criteria (MDC) Team



Photo: carolinapublicpress.org

Minimum Design Criteria (MDC) Team

Members selected by Rep. Millis, PENC and DENR.

Includes:

- Professors
- Engineers
- Local governments
- NC Home Builders
- Assoc General Contractors
- A soil scientist
- Environmental Interests
- DEMLR, DWR, DOT

Two Tasks of the MDC Team

1. To develop **MDCs** that encompass all requirements for siting, site preparation, design, construction, and maintenance of BMPs. Recommendations regarding MDCs due to the ERC on September 1, 2014.
2. To develop a **fast-track permitting process** for issuing state stormwater permits without a technical review when the applicant complies with the MDCs and the application is prepared by a qualified professional. The EMC shall adopt a fast-track rule by July 1, 2016.

Task #1: Develop MDCs

MDCs shall protect state water quality standards.

Some challenges:

- 13 different BMPs, each with unique design criteria.
- September 1, 2014 deadline.

Assets:

- Existing BMP Manual to use as a starting point.
- Storm-EZ can provide a framework for implementation.
- Knowledge and creativity of team members.

Task #2: Develop Fast-Track Permitting Program

Required components:

1. Process for permit application, review, & determination.
2. Process for ensuring compliance with the MDCs.
3. Specification for the qualifications that professionals must have to prepare a fast-track permit application.
4. Process for establishing the liability of professionals who prepares a fast-track permit applications for when the BMPs fail to comply with the MDCs.

MDC Team Schedule

Starts in March 2014

Estimated duration: 18 months

There will be channels for public information and input, the details are still TBD.

Minimum Design Criteria (MDC) Team

For more information:
Join our stormwater listserv to receive notices.





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Why is the EMC proposing a temporary rule?

HB 74 excludes “gravel” from the definition of "built-upon area." The EMC now seeks to:

- Define “gravel” to assist the regulatory community & protect the environment.
- Insure that “gravel” does not include aggregate materials that do not allow water to infiltrate.
- Be consistent with the Unified Soil Classification System (gravel diameter from 0.08 to 3 inches with < 5% fines).

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What does the proposed temporary rule say?

Updates the definition of “built upon area” per HB 74.

Makes a small change to the definition of “permeable pavement.”

Adds a definition of “gravel:”

“Gravel” means a clean or washed, loose, uniformly-graded aggregate of stones from a lower limit of 0.08 inches to an upper limit of 3.0 inches in size.

Effective March 28, 2014

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What does the proposed temporary rule say?

Definition applies only to our stormwater programs and not necessarily to erosion and sediment control programs.

A bill is expected to be introduced in the legislature this session that will no longer exclude “gravel” from the definition of built-upon area.

The bill will also prohibit the EMC from defining gravel.

The definition of gravel adopted in temporary rule, will likely not be in place for long





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How does this affect development projects?

Areas (both new and existing) meeting the definition of “gravel” will be considered as pervious.

Areas (both new and existing) covered in aggregate that does not meet the definition of “gravel” will be considered as impervious.

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Temporary Rule Schedule

1/15 – 2/7	Public comment period w/hearing on 1/23. Between 30-40 comments (top comments: gradation, terms “rounded, water- worn or pounded,” authority/need for a temporary rule.)
2/7 – 3/13	Worked with the Hearing Officer to revise the gravel definition. Implementation per the temporary rule for now.
3/13	Revised gravel definition to the EMC
3/17	Temporary rule to the Rules Review Commission

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