



Office of the City Manager

CONSENT CALENDAR

July 10, 2007

To: Honorable Mayor and
Members of the City Council

From: *PK* Phil Kamlarz, City Manager

Submitted by: Claudette R. Ford, Director, Public Works Department

Subject: Use of Permeable Surfaces on City Projects

RECOMENDATION

Adopt a Resolution 1) revising City of Berkeley parking and driveway standards, currently promulgated by the Transportation Division of the Public Works Department, to provide for use of permeable surfaces according to Bay Area Stormwater Management Agencies Association and Alameda County Clean Water Program C3 technical guidelines; and 2) encouraging the use of these standards for commercial and residential driveways and private parking spaces that require City permits.

FISCAL IMPACTS OF RECOMMENDATION

Staff cannot calculate the impact on costs of future City parking projects as information on lot and driveway sizes and types permeable materials, which may be used are unknown variables.

At present, many of the available permeable materials are new, and as such, are higher in cost than traditional materials (usually two to four times more costly). As a result, there may be increased costs associated with use of pervious materials in pilot projects for public parking lots. Additionally, designers will need to consult with a soils engineer to classify the soil to insure that the design solution provides adequate support without pavement failure. The actual amounts of the increased costs are not known at this time and are expected to go down as product availability increases in the future.

CURRENT SITUATION AND ITS EFFECTS

On June 13, 2006, staff was asked to evaluate the feasibility of new and replacement paving for outside parking spaces and driveways for City managed public improvement projects be made of permeable material, absent extenuating circumstances. Staff reviewed a variety of information issued by clean water experts and industry advocacy groups in order to identify feasible methods and materials available.

At this time, staff recommends revising parking standards for City parking lots to provide for the use of pervious pavement. Such usage would also be encouraged for single family residences and for parking spaces in commercial lots where slopes are less than 5% and where feasible as determined by BASMA guidelines. The majority of commercial developments already must

comply with clean water treatment requirements under the City's NPDES (National Pollutant Discharge Elimination System) permit. Staff will encourage use, where feasible, and will refer commercial builders to review their options with the City's Green Building Coordinator.

The City's NPDES permit already requires developers of parcels with 10,000 SF of new or replaced impervious surface to treat or retain storm runoff. The City also already mandates installation of clean water BMP's (Best Management Practices) including pervious pavement on all new construction to the maximum extent practicable for all new or reconstruction projects regardless of impervious area affected. Consistent with other cities and counties in the Bay Area, the City allows builders a list of choices to select from in order to achieve the required treatment level rather than mandating that specific BMP's be used at all sites. This is the approach endorsed by the Regional Water Quality Board and most experts. Mandatory implementation of one type of BMP such as mandatory use of pervious paving for use on all projects is not advisable since use of other BMP's or a combination of BMP's may achieve a better level of benefit.

BACKGROUND

There are a number of permeable pavements available today but their use and availability is still not widespread. None of the applications are recommended for high volume areas but can be used for parking spaces. Following is a discussion of the relative properties and merits of the most common solutions. Among these are permeable concrete, pervious asphalt, permeable pavers, and turf blocks.

Permeable concrete: This type of treatment consists of a 3-4 inch layer of permeable concrete on top of an 8-12 layer of angular crushed aggregate base. Sometimes a permeable pavement fabric is used. The concrete must include 15-25 % porosity. Permeable concrete generally has a lower loading capacity than traditional concrete (by about 50%). Use of permeable concrete pavement is problematic in cases where slopes are greater than 5 percent. An infiltration rate of 0.5 inches /hour in the native soil is required or the pavement will act like normal concrete. Clay soils present special problems that make use of permeable pavements very expensive. Since permeable concrete is not yet widely used, most batch plants do not have it readily available and will need to prepare individual batches based upon specifications provided by the designer. This is expected to greatly increase cost of the use of this material to about 2-3 times the cost of traditional concrete. Use of pervious pavements in areas where the ground water table is 10 feet or less from the ground surface is problematic and is usually prohibited.

Porous Asphalt: This type of treatment requires a recommended 3 inch thick wearing surface composed of pervious asphalt with a void content of 12-20 % with a 2 inch filter course over a permeable crushed aggregate base (6-10 inches thick). Filter fabric is required for clay soils. Use of porous asphalt pavement is problematic in cases where slopes are greater than a few percent. An infiltration rate of 0.5 inches /hour in the native soil is required or the pavement will act like normal asphalt. Porous asphalt has the same problem with clay soils as permeable concrete. This surface is wheelchair accessible. The cost is about two and a half to three and a half times as much as traditional asphalt concrete (AC).

Permeable Pavers (brick, stone): These consist of precast concrete pavers, bricks or cut stones installed over a layer of sand; a compacted crushed aggregate base (6-8") and or geotextile filter

fabric. Edge restraints such as concrete curbs are required. Use of these in clay soils is problematic similarly to permeable pavement and will require crushed aggregate base and geotextile fabric and compaction of the subgrade. Generally these surfaces are considered unsuitable for wheelchair accessibility purposes. This is an expensive option and will cost 3-4 times traditional concrete but also is likely to be received as more pleasing esthetically.

Gravel: A layer 6 to 12 inches is bedded on loosely compacted subgrade. It is problematic for clay soils and steep slopes. It works better if underlain with a paving filter fabric to keep fines from migrating out of the basement soil through the surface. Gravel pavement should utilize edge constraints such as wooden headers or concrete curb, and should not be used where ADA accessibility is required. Gravel is suitable only for low traffic areas and light parking. This treatment is relatively cheap compared to traditional concrete driveways and requires periodic grading and filling of displaced gravel. It may be perceived as less esthetically pleasing by many.

Turf Block: This is an open celled unit paver that works in conjunction with planted turf with a sand layer (1 inch thick) and a layer of aggregate base (6-8 inches). Its use in a number of locations in Berkeley has not been very successful. It may be adequate where vehicle traffic is rare and for occasional parking, but not for driveway or heavy parking use.

RATIONALE FOR RECOMENDATION

Public Works will require use of pervious pavements using BASMA's technical design guidelines and recommendations on public works projects for parking spaces in public lots and continue to monitor for opportunities to expand the applications of pervious materials when improved and economical products are available in the future.

ALTERNATIVE ACTIONS CONSIDERED

Any lesser alternative would not be environmentally responsible.

CONTACT PERSON

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Attachment:

1. Resolution

RESOLUTION NO. -N. S.

USE OF PERMEABLE SURFACES ON PUBLIC PARKING PROJECTS.

WHEREAS, current public parking standards require a durable year round surface; and

WHEREAS, permeable pavements can reduce runoff by facilitating runoff into soils; and

WHEREAS, Public Works Department staff has evaluated the feasibility of using permeable materials for new and replacement paving for outside parking spaces and driveways for City managed public improvement projects, as well as a variety of information issued by clean water experts and industry advocacy groups in order to identify feasible methods and materials available; and

WHEREAS, it would be in the City's interest to revise parking standards for City parking lots, currently promulgated by the Transportation Division of Public Works, to provide for the use of pervious pavement; and

WHEREAS, such usage would also be encouraged for single family residences and for parking spaces in commercial lots where slopes are less than 5% and where feasible as determined by BASMA guidelines.

NOW THEREFORE, BE IT RESOLVED by the Council of the City of Berkeley that the City Manager is directed to revise City of Berkeley parking and driveway standards, currently promulgated by the Transportation Division of the Public Works Department, to provide for use of permeable surfaces according to Bay Area Stormwater Management Agencies Association and Alameda County Clean Water Program C3 technical guidelines, said surfaces to be used where feasible for new and retrofit City public parking projects; and 2) encourage the use of these standards for commercial and residential driveways and private parking spaces that require City permits.