

A system for assembling a road as well as a road and a method for capturing traffic-produced contamination, use of a system of filters for removing traffic contamination from water, and a plastic supporting structure for supporting a road and having a filter

5 The disclosure relates to a system for assembling a road. The establishment of a road by assembling the road out of parts, wherein modules are available for lining-up and connecting to make the road, has the advantage that the footprint needed for putting down the road is relatively small. Also, the speed by which such a road can be laid is very advantageous.

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Overall, establishing such a road can be said to have a relatively low impact on the environment. WO 20207022888 A1 describes a system and a method for building such a road. The disclosure further relates to a road.

15 Rainwater that falls onto the road is preferably collected, and somehow guided into a predetermined direction, which may be the direction of a drainage system. When much rainwater falls, a drainage system cannot always cope. The supply of rainwater may simply be too much. Ideally, the rainwater, then often referred to as stormwater, may find its way into underground infiltration systems for temporarily storing the water. WO2016/042141
20 A1 describes an example of such systems. Over time, the water may from such systems slowly permeate into the ground. When such rainwater, or stormwater, finds its way into a system in which it is temporarily stored before it is released into the sewage system, reference is made to attenuation systems. Such systems do not allow for permeation of water from the underground storage into the ground.

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As with any road, rubber particles that are worn off from the tyres of cycles, motorbikes, and larger vehicles, contaminate the road and its surrounding. When it comes to motorized traffic, particularly fuel-driven traffic, over the road there is a chance that also oils may be released onto the road and into its surrounding. Further, in the environment are nowadays
30 always microplastic particles present. These are often captured by rainwater and end-up in the ground from where it is almost impossible to ever remove them. Such microplastics

may ultimately end in water that flows down the rivers and into the seas. Unfortunately, the microplastics are likely to enter the foodchain at some stage.

5 In view of the above, there is a need for addressing contaminations in rainwater that falls onto a road. However, land becomes more and more expansive. An extra footprint for capturing such contaminations is often considered too costly.

10 The disclosure also relates to a method for capturing traffic produced contamination. The disclosure further relates to use of a system of filters for removing contamination from rainwater. The disclosure relates also to a support structure for use in the system for assembling a road. The disclosure further relates to a road.

Summary of the disclosure

15 The disclosure provides a system for assembling a road. The system comprises a plurality of plastic support structures and a plurality of road deck elements. Each of the support structures comprises a base plate and at least one supporting element that extends, or is for extending, upwardly from the base plate for supporting at least partly one of the road deck elements. In an assembled condition, the system is such that when rainwater falls
20 onto the road, it predominantly flows away over the road to one or more rainwater collection points adjacent each support structure and/or each road deck element. The plurality of plastic support structures comprises a multi-functional support structure which is provided with at least one filter for filtering rainwater that has from the one or more rainwater collection points entered a treatment volume. At least a part of the at least one
25 filter is positioned within that treatment volume. The treatment volume may be spanned by dimensions of the multi-functional support structure.

Advantageously, facilitating the removal of contamination from rainwater can accordingly take place within space that is already taken up by infrastructure needed for a road. As the
30 multifunctional support structure is a one of the plurality of support structures which are present anyway for supporting the road deck elements of the road deck, there is hardly a need, if at all, for enlarging the footprint and/or the volume of the road. Preferably the

treatment volume is in its entirety within the dimensions of the multifunctional support structure, so that no extra footprint and no extra volume is required for having this facility for removing contamination from rainwater that falls onto the road. The treatment volume may be spanned by dimensions of the multifunctional support structure. This provides for a maximum of capacity for treating the water by filtering etc., without having to enlarge the footprint of the road. The treatment volume may exclude the one or more rainwater collection points.

According to an embodiment, in the assembled condition the system is such that rainwater which is collected by the one or more rainwater collection points and that has entered the treatment volume, includes rainwater which has flowed over at least another area of road deck. The other area of road deck is different from an area of road deck that covers that at least one multifunctional plastic support structure. Advantageously, for filtering all the rainwater that falls down on the road only one out of a plurality of plastic support structures needs to be provided with the at least one filter, making it not only economically viable for making the system, but also economically viable for maintaining the road in that only a relatively small number of the supporting structures will over time need to be assessed for cleaning or replacing the at least one filter, partly or in its entirety.

According to an embodiment of the system, in its assembled condition the system is such that rainwater which has been filtered by the at least one filter finds its way away from the treatment volume into other volume. Advantageously, there is no need to actively remove the filtered water. Further, the at least one filter can continuously be in use without a need for consumption of mankind-made energy sources.

In an embodiment, that other volume is covered by the other area of road deck. Thus, the filtered water may at least temporarily be kept under the road. Preferably, the other area of road deck is area of road deck under which no such multifunctional plastic support structure is present. Ideally, the other area of road deck is area of road deck under which an infiltration system is present for temporarily storing water before it permeates into the ground. Such systems are known systems and assist for instance in the handling of stormwater. When much rain falls in a short period of time and the drainage systems

cannot cope with the amount of rainwater, much of that water may quickly find its way into such systems. The system of the present disclosure allows for assembling a road and filtering out of rainwater that flowed over that road the contamination before that rainwater ultimately permeates into the ground. Preferably, a path for rainwater into such infiltration systems is predominantly, if not exclusively, available via the treatment volume,
5 and even more preferably, via the at least one filter.

Although it is envisaged that the other area of road deck is area of road deck under which an infiltration system is present for temporarily storing water before it permeates into the ground, it is also possible that instead of an infiltration system, and attenuation system is
10 present under that other area of road deck. It is even conceivable that under a part of that other area of road deck an infiltration system is present and that under another part of that road deck an attenuation system is present.

15 Preferably, at least one, and more preferably each support structure is usable as part of an attenuation system or part of an infiltration system.

As the rainwater is filtered before it finally enters the infiltration from where it over time permeates into the ground or is released into the sewage system, there is also no need to expect that infiltration systems over time slip full with small particles that undermine the capacity and the response time of the infiltration units, in case stormwater needs to be
20 managed, and/or, when the water should permeate from the underground infiltration systems into the ground.

25 Also for attenuation systems there is a need to avoid that contamination collects in the underground system and a need to avoid that from there the contamination find its way into rivers and the seas. Ideally, the contamination does not enter the attenuation system in the first place.

30 A system according to the disclosure, is expected to have a long life-time in use, with low maintenance requirements, and improved prospects for the environment.

Preferably, the system is free from concrete elements made of or comprising concrete. Preferably each element is made of plastic.

The disclosure also provides for a method for capturing contamination out of rainwater that has flowed over a road deck, comprising:

- collecting rainwater that has flowed over a road deck to one or more rainwater collection points adjacent the road deck;
- allowing the collected rainwater to flow into a treatment volume;
- allowing floating dirt in the treatment volume to be separated from the rainwater;
- allowing the rainwater in a part of that treatment volume to flow through a relatively coarse filter;
- allowing the rainwater downstream of that coarse filter to flow through a relatively fine filter that is configured to capture at least one of Petroleum Hydrocarbons (TPH), Fats, Oils and Grease (FOG), oily sheen, microplastic particles and small rubber particles;
- allowing the rainwater downstream of that relatively fine filter to move away from the treatment volume.

Preferably, the treatment volume is underneath the road

- In an embodiment, the collected rainwater is collected from parts of the road which are free from having underneath the road the treatment volume. Preferably, the parts of the road that are free from having underneath the road the treatment volume, have underneath the road an infiltration system for temporarily storing rainwater before it permeates into the ground, or have underneath an attenuation system for temporarily storing rainwater before it finds its way further into sewage system. Rainwater downstream of that relatively fine filter preferably moves thus into an infiltration system or into an attenuation system.

The disclosure further provides use of a system of filters for removing contamination from water, wherein the use is preferably in a system for assembling a road.

- The disclosure also provides a support structure made of plastic and comprising a base plate and at least one supporting element, extending, or for extending, upwardly from the base

plate for supporting at least partly a road deck element in a system for assembling a road. The support structure is provided with at least one filter for filtering rainwater that has entered a treatment volume, wherein the treatment volume is preferably spanned by dimensions of the support structure, wherein at least a part of the at least one filter is oriented parallel to the surface of the water or includes an acute angle with the surface of the water, and/or wherein at least a part of the at least one filter is configured to adsorb and capture at least one of Petroleum Hydrocarbons (TPH), Fats, Oils and Grease (FOG), oily sheen, microplastic particles and small rubber particles, the at least one filter being positioned around and/or between the at least one supporting element, so that the support structure itself is unchanged by the presence or absence of the at least one filter.

The disclosure also provides a road having a road direction. The road comprises a plurality of road deck elements placed next to each other in at least the road direction. The plurality of road deck elements being supported by a plurality of plastic support structures. Each of the plastic support structures comprises a base plate and at least one supporting element, extending, or for extending, upwardly from the base plate for supporting at least partly one of the road deck elements. The road deck is configured so that when rainwater falls onto the road deck, it predominantly flows away over the road deck to one or more rainwater collection points adjacent each support structure and/or each road deck element. The road is provided with a treatment volume for removing contamination from rainwater that fall onto the road. The plurality of plastic support structures comprises at least one multi-functional support structure which is provided with at least one filter for filtering rainwater, that has from the one or more rainwater collection points entered the treatment volume. At least a part of the at least one filter is positioned within the treatment volume. Preferably, the at least one filter is in its entirety within the treatment volume.

In an embodiment, the road is provided with a number of fluid communications for replacement of water according to a predetermined route. Advantageously, the rainwater together with the contamination it picked up from the road is less likely to flow directly into the ground underneath and/or next to the road. The fluid communications according to a predetermined route allow for ensuring that the water enters the treatment volume, does pass filters, and then for instance enters an infiltration or attenuation system.

In an embodiment, the number of fluid communications comprise fluid communications of a first type and fluid communications of a second type, wherein the fluid communications of the first type requires the presence of water to establish the communication under influence of the force of gravity, and wherein the communication of the second type requires the presence of an amount of water in terms of a certain height relative to a height of a structural element. These two types of fluid communications are each environmentally friendly, do not require engine driven pumps etc., do not require maintenance, and are always present.

In an embodiment, the road has a fluid communication of the first type between the road deck and the one or more rainwater collection points, and has a fluid communication of a first type and/or a fluid communication of a second type between the one or more collection points and the treatment volume. Advantageously, water flows freely from the road and “flushes” with it contamination that was on the road. As soon as it is of the road, the replacement of water is slowed down, and sedimentation of the contamination can start.

In an embodiment, the road also comprises a fluid communication of a third type which relies on the principle of interconnecting vessels. This allows for removal of contamination that floats on top of water. This type of fluid communication also allows to the removal of contamination that floats in water, for instance when a fine filter is placed in the fluid communication of the third type.

The usage of these three types of fluid communication allows for a compact route for the water from the road deck through the treatment volume, into for instance infiltration systems all under the road deck.

Brief Description of the Drawing

The drawing illustrates by way of example only several embodiments of the present disclosure, wherein identical reference numerals refer to identical or similar elements or features in different views or embodiments shown in the drawing. Where in the brief description of the drawing reference is made to a system, it should be borne in mind that

the reference also entails a reference to a road, i.e. the system in assembled condition. In the drawing:

Fig. 1 shows an embodiment of a system according to the disclosure, in assembled
5 condition;

Fig. 2 shows a part of an embodiment of a system according to the disclosure;

Fig. 3 shows a part of Fig 2 in more detail;

Fig. 4 shows a part of an embodiment of a system according to the disclosure;

Fig. 5 shows the part shown in Fig 4 without a road deck element;

10 Fig. 6 shows a part of an embodiment of system according to the disclosure;

Fig. 7 shows a part of an embodiment of a system according to the disclosure;

Fig. 8 shows in more detail a part of an embodiment of a system according to the disclosure;

15 Fig. 9 shows a part of an embodiment of a system according to the disclosure, seen from above;

Fig. 10 shows a cross-sectional view of a part of an embodiment of a system according to the disclosure

Fig. 11 shows a part of an embodiment of a system according to the disclosure, without a part of road deck;

20 Fig. 12 shows a part of an embodiment of a system according to the disclosure, and the direction into which water moves through that part displayed by arrows;

Fig. 13 shows a part of an embodiment of a system according to the disclosure, and the direction into which water moves through that part displayed by arrows;

25 Fig. 14 shows a part of an embodiment of a system according to the disclosure, and the direction into which water moves through that part displayed by arrows;

Fig. 15 shows a part of an embodiment of a system according to the disclosure,

Fig. 16 shows a part of an embodiment of a system according to the disclosure

Fig. 17 shows a part of an embodiment of a system according to the disclosure

Fig. 18 shows a part of an embodiment of a system according to the disclosure

30 Fig. 19 shows a part of an embodiment of a system according to the disclosure

Fig. 20 shows a part of an embodiment of a system according to the disclosure

Fig. 21 shows schematically a part of an embodiment of a system according to the disclosure, in which dashed lines show possible water levels when the system is in use

Fig. 22 shows schematically a part of an embodiment of a system according to the disclosure, in which dashed lines show possible water levels when the system is in use

5 Fig. 23 shows schematically a part of an embodiment of a system according to the disclosure;

Fig. 24 shows schematically a part of an embodiment of a system according to the disclosure;

10 Fig. 25 shows schematically a part of an embodiment of a system according to the disclosure;

Fig. 26 shows schematically a part of an embodiment of a system according to the disclosure;

Fig. 27 shows schematically a part of an embodiment of a system according to the disclosure;

15 Fig. 28 shows schematically the direction of the replacement of water in the embodiment shown in fig. 24;

Fig. 29 shows schematically the direction of the replacement of water in the embodiment shown in Fig. 25;

20 Fig. 30 shows schematically the direction of the replacement of water in the embodiment shown in Fig. 26;

Fig. 31 shows schematically the direction of the replacement of water in the embodiment shown in Fig. 27.

Detailed description of the disclosure with references to the drawing

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In the description like-parts are most often referred to by like-references. In this disclosure, phrases like “surface of the water”, “ rainwater collective points”, “flow of rainwater”, and expressions are considered references that are easily understood and consistent in meaning throughout many languages given that everywhere rain falls downwards under influence of gravity, and also flows under influence of gravity along a path availability for flowing. An
30 expression that “water finds its way from A to B” is to be interpreted that there is in any case a fluid-communication between A and B.

Where in the detailed description of this disclosure reference is made to a system or part of a system, this entails also a reference to a road or part of a road. The road is the system in an assembled condition.

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Figure 1 shows a part of a road 1 that can be made with a system according to the present disclosure. Fig. 1 shows an embodiment of the system once it has been put in an assembled condition. In this example, two road deck elements 2 which are almost square-shaped, are on either side of a smaller two-part road deck element 3. The almost square-shape road deck elements 2 each cover, and are supported by, two plastic support structures 4, which are partly visible in fig. 2 and much better visible in Fig 14. The smaller road deck element 3, having two parts 3a and 3b, covers, and is supported by, a plastic support structure 4 that is in fact a multifunctional support structure 8. Further below, it will become clear to the reader why the term “multi-functional” is selected for referring to that structure. The arrows A show the direction of the road, also referred to as the road direction, or even the direction of traffic over the road.

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In Fig. 2 is more clearly visible that each support structure 4 comprises a base plate 5 and at least one supporting element 6, extending upwardly from the base plate 5 for supporting at least partly one of the road deck elements 2. The at least one supporting element 6 is in the embodiment shown as an integral structural feature of the structure 4. That is, the supporting element 6 and the base plate 4 form each a structural feature of a one-piece structure 4. In the embodiment shown throughout this disclosure, the supporting element and the baseplate are seamlessly connected with each other. In an alternative embodiment (not shown), the supporting element 6 is a separate element that is connectable to the base plate 5. That supporting element is thus for extending upwardly from base plate 5, for supporting at least partly one of the road deck elements 2. Reference is further made to WO2020/022888 A1, which also describes supporting structures, suitable for supporting at least partly a road deck element. At least one and preferably each supporting element 6 is hollow and cone-shaped and allows for compact stacking onto each other during storage and transport of the supporting structures. The support structures 4, including the supporting elements 6 are each

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water-permeable, not by the nature of the material but by the presence of perforation in the structure and/or slits, openings etc.

In an assembled condition, the system is such that when rainwater falls onto the road 1, it
5 predominantly flows away over the road 1 to one or more rainwater collection points CP. In
this disclosure, the phrasing "flows over the road" is to be understood as contrasting to
"flowing into the road or through the road". The phrasing "predominantly flows over the road"
is understood to mean that more than, say 90%, of the water flows over the road, as opposed
10 to flowing into or through the road. Ideally more than 95%, and even more preferably more
than 99% flows over the road. Flowing into or through the road would for instance be possible
if the road deck would be water permeable or for instance when the road deck is provided
with many perforations. Another way of describing this aspect is by pointing out the presence
of a fluid communication. In this disclosure, this fluid communication between the road and
the rainwater collection points is referred to as a fluid communication of the first type, which
15 is in this disclosure a fluid communication that requires the presence of water to establish a
communication under the influence of the force of gravity.

Flow of rainwater is in this disclosure to be understood as driven by gravitational forces. The
rainwater mainly flows when a "path" for flowing is available. Although that path is at least
20 partly made available by the force of gravity, this does not mean that the flow is always in the
direction of the force of gravity. Structure features may guide the water whilst flowing under
the influence of the force of gravity.

The water collection points are adjacent each support structure 4 and/or each road deck
25 element 2, 3a, 3b. The actual position of the water collection points, can be next to the road,
a little under the road, for instance at a side of the road, next to the support structure, etc.
and is thus not critical provided that it is adjacent enough and so that water that has flowed
over the road can be collected at the rainwater collection points. Another way of describing
this aspect is by pointing out the presence of a fluid communication. In this disclosure, the fluid
30 communication between the road and the rainwater collection points is referred to as a fluid
communication of the first type, which is in this disclosure a fluid communication that requires
the presence of water to establish a communication under the influence of the force of gravity.

An example of the flow direction of water is schematically presented in Fig. 2 by a line having multiple arrows, referred to as WF. An embodiment of the system comprises a plurality of inlet-gutter parts 7, so that in an assembled condition of the system adjacent each support structure 4 and/or each road deck element 2, 3a, 3b at least a part of an inlet gutter 7 extends for functioning as multiple rainwater collection points CP. In an assembled condition of the system the inlet gutter 7 streamlines in a traffic direction A of the road 1 a flow of rainwater of which at least a large amount of rainwater has flowed over the road deck of the road. However, it is pointed out that the inlet-gutter can be extending into any other direction, such as for instance, somewhat transvers to the road direction, and does also not need to extend into a straight line.

The plurality of plastic support structures 4 comprises a multi-functional support structure 8 which is provided with at least one filter 9 for filtering rainwater that has from the one or more rainwater collection points CP entered a treatment volume TV which is preferably spanned by dimensions of the multi-functional support structure 8. The treatment volume fits thus, at least partly, ideally within a geometrically determined volume that is defined by connecting the most outer positions of the supporting structure. At least a part of the at least one filter 9 is positioned within that treatment volume TV. Preferably, the at least one filter in its entirety within the treatment volume. Reference is made to Figures 24-27 and the description thereof for further variations of the treatment volume TV.

Going back to Fig. 1, in the assembled condition an embodiment of the system is such that rainwater which is collected by the one or more rainwater collection points 7 and that enters the treatment volume TV, includes rainwater which has flowed over at least another area of road deck, wherein the other area of road deck (ORD) is different from an area of road deck (RD) that covers that at least one multifunctional plastic support structure 8. This is in Fig. 1 schematically shown by the dashed line visible under the road deck elements 2, 3a, 3b. That dashed line enters a volume under road deck element 3a. On the top of the road deck elements 2, 3a, 3b also dashed lines and dashed arrows are shown, schematically indicating that in an assembled condition the system, and the road, is such that rainwater which has been filtered by the at least one filter, finds its way away from the treatment volume TV into

other volume. Preferably, that other volume is covered by the other area of road deck 2, so that it is not again contaminated by contaminants, for instance contaminants which are produced by traffic that moves over the road. Preferably, the other area of road deck 2 is area of road deck 2 under which no such multifunctional plastic support structure 8 is present.

5 Although, not necessarily the case for all systems according to the disclosure, the other area of road deck is area of road deck 2 under which an infiltration system is present for temporarily storing water before it permeates into the ground.

The system of the embodiment shown comprises a plurality of inlet-gutter parts 7, so that in an assembled condition of the system adjacent each support structure 4, 8 and/or each road deck element 2, 3a, 3b at least a part of an inlet gutter 7 is provided, extending in the direction A of the road for functioning as multiple rainwater collection points CP. The inlet gutter parts 7, shown in Fig. 15 and 16, are generally U-shaped and connectable, given spigots and sockets that allow for a swift connecting during assembling and then allow for a watertight connection.

10 In an assembled condition of the system, the inlet gutter 7 streamlines in a traffic direction A of the road a flow of rainwater of which at least some rainwater has flowed over the other area of road deck 2 (ORD). In an assembled condition of the system the inlet gutter 7 also collects rainwater that has flowed over the area of road deck 3a, 3b (RD) that covers one of the multi-functional plastic support structures 8. Not only figure 1 but also Fig 12 displays this schematically by means of arrows. In the assembled condition of the system rainwater flows into the treatment volume TV when the rainwater has reached a predetermined height in the inlet gutter 7. The part of the inlet gutter 7 that is adjacent the multifunctional plastic support structure 8 and/or road deck 3a is provided with flow exits 10 for releasing rainwater into the treatment volume TV. Fig 16 shows such a part of the inlet gutter 7.

15 Typically, the flow exits 10 assists in forming a fluid communication of the second type, which require the presence of an amount of water in terms of a certain height relative to a height of a structure element. In this case, the structural element is the lower rim of the opening of the inlet gutter 7 that allows for water to flow into the treatment volume TV. Also the gravity plays a role in this fluid communication.

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Fig 4 to Fig 12 show various views of the multifunctional plastic support structure 8. From comparing Fig 4 and 5, it is clear that in the assembled condition of the system, the treatment

volume TV is in its entirety under area of road deck 3a, 3b that covers that at least one multi-functional support structure 8. This optimizes the use of the multifunctional plastic support structure and the capacity of the treatment volume TV. In Fig. 5, 8, 11 and 19, is visible that multi-functional plastic support structure 8 may be provided with upwardly standing side plates 18. These can for instance be placed and held in fixed position by a connection at multiple positions with the multifunctional support structure 8. These side plates provide support for an impermeable foil that may be placed at an outer side of the multi-functional support structure, i.e. underneath the base plate 5, and inside the side plate 18 and for instance between the inlet-gutter 7 (and outlet gutter 12) and the multi-functional support structure 8 for providing a physically delimited treatment volume TV. Figures 24-27 show schematically further possible embodiments.

The at least one filter 9 comprises upstream a coarse filter 9a for filtering particles out of the water based on a mesh size of the filter. As shown in Fig 4, 5, 6, 7, 10, and 12, in an assembled condition of an embodiment of the system, at least a part of the coarse filter 9a is oriented parallel to the surface of the water. However, there may additionally, or alternatively, be at least a part that includes an acute angle with the surface of the water. The treatment volume TV is upstream the coarse filter arranged to let rainwater pass a position that is below the coarse filter 9a. Another way of describing this is by pointing out the presence of a fluid communication of a third type which is based on the principle of interconnecting vessels.

The at least one filter 9 comprises downstream of the coarse filter 9a a relatively fine filter 9b that is configured to capture at least one of Petroleum Hydrocarbons (TPH), Fats, Oils and Grease (FOG), oily sheen, microplastic particles and small rubber particles. The at least one filter may also comprise a floating dirt separator for separating floating dirt from the rainwater that flows through and thus out of the at least one filter. An oil separator OS, may be an example of such a floating dirt separator. The floating dirt separator may be positioned at the most upstream part of the at least one filter 9. The term "filter" thus also embraces this concept of a separator. Also, this floating dirt separator is a form of a fluid communication of the third type.

The treatment volume TV includes at least one part for facilitating sedimentation. The at least one part for facilitating sedimentation comprises a first part S1 for facilitating sedimentation upstream the at least one filter. The at least one part for facilitating sedimentation comprises a second part S2 for facilitating sedimentation upstream the relatively fine filter. The treatment volume is in this example defined by impermeable material shaped for holding a volume of water that is at most equal to the treatment volume. The impermeable material could be a foil, f.i. bag-shaped or container-shaped into which the multi-functional support structure is positioned. The treatment volume TV is provided with an overflow-exit which regulates that the treatment volume at most holds a volume of water that is equal to the treatment volume TV. Preferably, in an assembled condition of the system, the system comprises at least one overflow-exit, preferably under the road deck. An overflow-exit is an example of a fluid communication of the second type. An overflow-exit is not necessarily a dedicated hole in an element of the system, it may equally be limited height of a part that physically delimits the treatment volume TV, or a change in material from water-impermeable to water-permeable. Figure 19 and 20 indicate where in an embodiment of the system in the assembled condition the functioning of an overflow-exit may be facilitated. The same applies for a pathway for aeration.

An embodiment of the system as shown also comprises a plurality of outlet gutter-parts 12, so that in an assembled condition of the system adjacent each support structure 4, 8 and/or each road deck element 2, 3a, 3b at least a part of an outlet-gutter 12 extends in the direction of the road, for streamlining in a direction of the road a flow of rainwater that has been filtered by the at least one filter 9. Also, for the outlet gutter 12 it applies that these may additionally, or alternatively, at least partly extend in a direction that is transverse to the road direction.

In the embodiment shown, the relatively fine filter 9b comprises a number of walls which are water permeable. A downstream side of the walls has a fluid communication with the outlet gutter 12. This is a fluid communication of the third type, enabled by the principle of interconnecting vessels. Preferably, the walls have at least partly the shape of pipes 11 of which an upstream end is closed by a part 11a of the walls and of which a downstream end 11b streamlines a flow of filtered rainwater into the outlet gutter 7. As will be shown below, it is also possible that a downstream side of the walls forms the outlet gutter. However,

although not shown, the downstream end 11b may also streamline filtered water directly into volumes that neighbour the treatment volume and that is under the other area of road deck (ORD). The pipes 11 may each have annular ribs and infiltration holes therein between. A geotextile sheet may be wrapped around each of such the pipes 11. Such pipes are known as
5 IT -pipes. The geotextile may be woven or non-woven. Non-woven geotextile is more often used.

The longitudinal direction of the pipes 11 are preferably across the traffic direction of the road. This ensures that treatment volume TV and the multi-functional support structure 8 only need
10 to occupy over a short stretch of the volume under the road in the road direction. Further, only over a short stretch of the road needs the road to be open when cleaning and/or replacing of filters, parts for sedimentation etc are needed.

In the assembled condition of the embodiment shown, rainwater that has been filtered by the
15 at least one filter enters via the outlet gutter volume under the other area of road deck (ORD). In the assembled condition of the system, in the outlet gutter parts 12 adjacent the plastic support structures 4 which are different from the multi-functional support structure 8, at least one flow exit 13 is provided as shown in Fig. 17 for releasing filtered rainwater into the volume under the other area of road deck (ORD), by establishing a fluid communication of the third
20 type. Figure 18 shows an outlet-gutter part 12 for placement next to the multi-functional support structure 8. Prefabricated closed recesses 16 for connecting pipes 12 are already provided. The recesses 16 can easily be opened by removing the material that closes the recess off. The recesses in Fig. 18 are shown to be opened.

25 As can be seen from Fig. 15-18, the inlet-gutter parts and the outlet-gutter parts can be identical. The flow exits 10 and 13 can also be identical. This allows for an economically viable way of making the inlet- and outlet-gutter parts.

Under the other area of road deck (ORD) an attenuation system is present for temporarily
30 storing water before it permeates into the ground. Reference is made to WO 20207022888 A1 for a road that is also made using attenuation systems, and to WO2016/042141 A1 for an example of an attenuation system.

The road deck 3a,3b that covers one of the multi-functional plastic support structures 8, has a first part 14a and a second part 14b, wherein the first part 14a, can be lifted independently of the second part 14b, and wherein the first part extends at most up to a part of the width of the road. Advantageously, a part of the width of the road can still be used when the required maintenance and cleaning activities are carried out. Lifting the first part will also facilitate access to inlet-gutter 7 for cleaning that gutter. The first part 14a and second part 14b may be releasably secured to a supporting element 6 of the respective support structure 8. A person skilled in the art will be able to apply such a releasable connection for that purpose.

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Each of the plastic support structures of the plurality of plastic support structures is in structure the same, and preferably also in dimensions the same. This enables an economically viable way of producing the system. Preferably each of the structural features that has been added to a support structure to change it functionally into a multifunctional support structure, is mechanically connectable to that structure or placeable onto that structure. Preferably, the support structure itself, in terms of the base plate 5 and the supporting elements 6, is unchanged by the presence or absence of the at least one filter.

In an assembled condition of the system, one plastic support structure out of at least five, preferably out of at least 10, and even more preferably out of at least 15 of out of the plurality of support structures corresponds to one of the multi-functional plastic support structures. It is not inconceivable that only one out of twenty, thirty or even forty support structures needs to be a multifunctional support structure to obtain a road that allows for filtering the rainwater out of the water that flows over the road.

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A dimension of a road deck element 2 is in traffic direction of the road 1 preferably able to span in an assembled condition of the road 1 at least two plastic support structures 4. The road deck elements 2, 3a, 3b are preferably shaped such that in an assembled condition of the system the road slightly slopes off towards one side of the road, by a slope of the road deck elements. Each road deck element may then have a most upper road deck that in the assembled condition of the system slightly slopes off (1-3%) in one direction across a traffic direction of the road. Accordingly, the water would always flow towards the side at which the

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inlet gutter is positioned. However, often this sloping of the road may be achieved by simply ensuring that the ground of the bedding has a slope that is between 1 and 3 % degrees, so that the system does not need to facilitate for achieving a slight slope.

5 In the assembled condition of the system, the flow exits 10 in the inlet gutter parts 7 for releasing rainwater into the treatment volume TV facilitate the generation of a flow when a first height of water in the inlet gutter 7 is reached, and the flow exits 13 in the outlet gutter parts 12 for releasing rainwater into volume under road deck elements 2 facilitate the generation of an flow when a second height of water in the outlet gutter 12 is reached. The first and the second height may be the same, enabling a simplification of the production of the gutter parts, the logistics and storage thereof, etc. It is thus possible to have a series of fluid communications causing the water to replace itself through the treatment volume. The gutters 7 and 8 are, as can be seen from figures 15-18 very similar, if not identical, apart from the presence of flow exits 10, 13.

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The gutter part 7, 12 are preferably provided with integral connectors 20 at positions shown in Fig. 15-18 for connecting to for instance a supporting element 6 (upper connector 20) and the base plate 5 (lower connector 20). The supporting elements 6 and the base plate 5 ideally has corresponding integral connecting points. The type of mechanical connections that are suitable can easily be chosen by a person skilled in the art. For instance, a snap-fit connection that is firm, requires no extra tools, and allows for disconnecting in a non-destructive fashion, may be ideal. As is also seen, the gutter parts 7,12 are preferably each incorporated in stabilizing part 19, that provides for a stable positioning of the respective gutter part, as it not only allows for connecting to the support structure, but also for resting on the ground.

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Figure 21 and 22 show schematically, the level of the water (by dashed lines), relative to the parts of an embodiment of the system when the base-plate 5 is put under a small angle with the horizontal level. Fig. 21 shows the multifunctional support structure 8 and Fig. 22 shows the support structure 4. If the respective flow exits 10, 13 are indeed at the same heights in the inlet gutter 7 and in the outlet gutter 12, than this positioning facilitates in a relatively slow movement of the water through the system, facilitating even more the sedimentation and/or the filtering.

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Preferably, an embodiment of a system according to this disclosure is provided with at least one sensor for detecting the status of the at least one filter, wherein status includes one of filter sensitivity, filter capacity, and pressure exerted onto the filter.

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The road decks 2, 3a, 3b are connectable to each other, preferably using a spacer for fixation to a construction element (in this case a road deck) , for maintaining a relative distance to another construction element (road deck), and for restricting a movement about a position relative to another construction element (road deck), such as disclosed in WO 2019/170630.

10 Ideally, a gap between the road decks is occupied by rubber strip 17 as for instance shown by Fig 23.

Fig. 24 shows schematically a part of an embodiment wherein the system is such that in an assembled condition of the system the inlet gutter 7 extends through the impermeable material 22. Similarly, the outlet gutter 12 extends through the impermeable material 22. The impermeable material may be shaped as a large “container-bag 20” that is open at the top. At the points where the inlet gutter 7 and/or the outlet gutter 12 extends through the impermeable material 22, a watertight sealing connector is provided. The outlet gutter 12 may be the same as the pipe-shaped fine filter 11, as shown in Figs. 12 and 13, in the example of Fig. 24 being oriented in a direction of the road.

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Where the outlet gutter 12 and the pipe-shaped fine filter 11 coincide with each other, i.e. are the same “pipe”, the treatment volume is at least partially delimited by a downstream side of that filter. The part of the pipe that is external of the impermeable “container-bag 20” is preferably not made of filter material, but of impermeable material 22.

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Figs. 25-27 show embodiments wherein the inlet gutter 7 is in its entirety external of the impermeable material 22 that is in these Figures formed by a “container-bag 20” and that is open at the top.

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Fig. 26 shows an embodiment in which the pipe-shaped fine filter 11 is only forming an outlet gutter 22 in one direction of the road, instead of in two directions as shown in Figs. 24 and 25.

Fig. 27 shows an embodiment in which the fine filter having water-permeable walls are following the contours of the impermeable material 22 that forms the “container-bag 20”. However, the water-permeable walls 23 are an upward extension 24 of the impermeable walls 22 of the open upper end of the container-bag 20. This embodiment allows for water to flow away from the treatment volume TV, through the fine filter, without being streamlined by an outlet gutter. In this case a fluid communication of the second type is established.

For the sake of completeness, Fig. 28, 29, 30 and 31 show schematically the liquid-communication, also referred to as the replacement of water (or flow of water) as would follow from the structural arrangement of the embodiments schematically represented by, respectively Fig. 24, 25, 26 and 27. The arrows show schematically the direction into which the water replaces, using the fluid-communications that are establishable.

Preferably, the system and thus also the road, is free from elements that comprise concrete, so that the system is easily transportable in unassembled condition, and easily installable. Preferably, each element of the system is made of plastic, ideally partially of recycled plastic. The plastic can be suitable thermoplastic, or a suitable thermoplast or a suitable thermoharder to ensure that the support structures provide enough support for a road deck carrying motorized traffic. A relatively large number of supporting elements per square meter may be required. Ideally that number is in a range of 4 to 16, more preferable in a range 8 to 12. The supporting elements are preferably hollow and allow water to enter the elements, so that the capacity of the volume available for water is hardly affected by the number of supporting elements. The at least one filter is, as shown in the figures, ideally in its entirety in the treatment volume.

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The embodiments shown are examples of a system that allows for carrying out a method for capturing contamination out of rainwater that has flowed over a road deck, comprising:

- collecting rainwater that has flowed over a road deck to one or more rainwater collection points adjacent the road deck;
- allowing the collected rainwater to flow into a treatment volume;
- allowing floating dirt in the treatment volume to be separated from the rainwater;

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- allowing the rainwater in a part of that treatment volume to flow through a relatively coarse filter;
- allowing the rainwater downstream of that coarse filter to flow through a relatively fine filter that is configured to capture at least one of Petroleum Hydrocarbons (TPH), Fats, Oils and Grease (FOG), oily sheen, microplastic particles and small rubber particles;
- allowing the rainwater downstream of that relatively fine filter to move away from the treatment volume.

10 The treatment volume TV may be underneath the road. The collected rainwater may be collected from parts of the road which are free from having underneath the road the treatment volume. Preferably, the parts that are free from having underneath the road the treatment volume, have underneath the road an infiltration system for temporarily storing rainwater before it permeates into the ground. Preferably, rainwater downstream of that relatively fine filter moves into the infiltration systems. Instead of infiltration systems, attenuation systems may be employed, in which water is temporarily stored before it finds its way into a sewage system.

Any known system for treating, and preferably filtering, water so as to remove contamination, may be employed. Such system may each be scaled up or down for removing contamination from water, and for placement under a part of a road.

The multi-functional support 8 structure ideally comprises the same base plate 5 and the same supporting elements 6 as comprised by the other supporting structures 4. The multi-functional support structure 8 also holds filters 9 in addition to supporting at least a part of the road deck.

The term “multi-functional” as used throughout this disclosure is not be construed in a sense that the other support structures 4 would not carry out functions that differ from supporting at least a part of a road deck.

The disclosure is not limited to the examples shown and discussed. Many variations and modifications are feasible. Each of these modifications and variations is within reach of a skilled person, once the present disclosure has been understood.

- 5 For instance, the supporting elements are shown as cone-shaped columns, but these may have any shape, including cylindrical, rectangular, block-shaped, extending not only upwardly but also laterally.

10 The term road includes a very small road, more like a drive, and includes a road having a “dead-end”.

Instead of pipes 12 for the fine filter, any other shape is feasible for the wall that forms part of the fine filter. The walls may itself have many structural features, such as for instance circumferentially extending ribs, and may have many “perforations” or may be open by
15 porosity to enhance the filtering sensitivity. In addition to the more rigid walls, or as an alternative to such rigid walls, also very flexible wall may be employed, including those made of cloth, textile, woven or non-woven fiber-based filter material etc.

20 The direction of collected rainwater flow can be chosen as is desirable and suitable for the positioning of the road, employing the different types of fluid communications. The path from rainwater to infiltration/attenuation system can be made so that it has much length and allows for sedimentation. Equally the “throughput” can be chosen and adapted, if needed by enabling more fluid communication to be established.

25 It is also possible to apply the present disclosure such that volume under the road divided up in two volumes that extend parallel to each other in road direction. One of the volumes may be used as the treatment volume, i.e. for removing contamination, and the other volume may be used for infiltration/attenuation purposes of the de-contaminated water. Such systems may be useful where the road itself is in road direction going slightly upwards or downwards.
30 The possible variations and modifications within the framework of the appended claims are endless.

Claims

- 5 1 A system for assembling a road having a road deck and a road direction, wherein the system comprises a plurality of road deck elements for forming the road deck by placement of the road deck elements next to each other in at least the road direction, wherein the system further comprises a plurality of plastic support structures, wherein each of the support structures comprises a base plate and at least one supporting
10 element, extending, or for extending, upwardly from the base plate for supporting at least partly one of the road deck elements, wherein in an assembled condition the system is such that when rainwater falls onto the road deck, it predominantly flows away over the road deck to one or more rainwater collection points adjacent each support structure and/or each road deck element, wherein the plurality of plastic support structures
15 comprises a multi-functional support structure which is provided with at least one filter for filtering rainwater that has from the one or more rainwater collection points entered a treatment volume, wherein at least a part of the at least one filter is positioned within that treatment volume.
- 2 A system according to claim 1, wherein the treatment volume is spanned by dimensions
20 of the multifunctional support structure and/or is within outer dimensions of the multifunctional support structure.
- 3 A system according to claim 1 or 2, wherein the treatment volume excludes the one or more rainwater collection points.
- 4 A system according to claims 1, 2 or 3, wherein in the assembled condition the system is
25 such that rainwater which is collected by the one or more rainwater collection points and that has entered the treatment volume includes rainwater which has flowed over at least an other area of road deck, wherein the other area of road deck is different from an area of road deck that covers that at least one multifunctional plastic support structure.
- 5 A system according to any one of claims 1 -4, wherein in an assembled condition the
30 system is such that rainwater which has been filtered by the at least one filter finds its way away from the treatment volume into other volume.

- 6 A system according to claim 5 wherein that other volume is covered by the other area of road deck.
- 7 A system according to claims 4, 5 or 6 wherein the other area of road deck is area of road deck under which no such multifunctional plastic support structure is present.
- 5 8 A system according to any one of claims 4-7, wherein the other area of road deck is area of road deck under which an infiltration system is present for temporarily storing water before it permeates into the ground, or under which an attenuation system is present.
- 9 A system according to any one of claims 1-8, wherein the system comprises a plurality of inlet-gutter parts, so that in an assembled condition of the system adjacent each support structure and/or each road deck element at least a part of an inlet gutter extends in the road direction for functioning as rainwater collection points, and/or extends in a direction transverse to the road direction for functioning as rainwater collection points.
- 10 A system according to claim 4 and 9, wherein in an assembled condition of the system, the inlet gutter streamlines in the road direction a flow of rainwater of which at least some rainwater has flowed over the other area of road deck.
- 15 A system according to claim 9 or 10, wherein in an assembled condition of the system, the inlet gutter also collects rainwater that has flowed over the area of road deck that covers one of the multi-functional plastic support structures.
- 12 A system according to any one of claims 9-11, wherein in the assembled condition of the system, rainwater flows into the treatment volume when the rainwater has reached a predetermined height in the inlet gutter.
- 20 A system according to anyone of the previous claims, wherein in the assembled condition of the system, the treatment volume is in its entirety under area of road deck that covers that at least one multi-functional support structure.
- 25 14 A system according to any one of claims 1-13, wherein the system comprises a plurality of outlet gutter-parts, so that in an assembled condition of the system adjacent each support structure and/or each road deck element at least a part of an outlet-gutter extends in the direction of the road, for streamlining in a traffic direction of the road a flow of rainwater that has been filtered by the at least one filter.
- 30 15 A system according to at least claims 4 and 14, wherein in the assembled condition of the system, rainwater that has been filtered by the at least one filter enters via the outlet gutter volume under the other area of road deck.

- 16 A system according to claim 15, wherein the system in the assembled condition comprises under the other area of road deck an infiltration system for temporarily storing water before it permeates into the ground, and/or comprises under the other area of road deck an attenuation system.
- 5 17 A system according to any one of the previous claims, wherein the at least one filter comprises upstream a coarse filter for filtering particles out of the water based on a mesh size of the filter.
- 18 A system according to claim 17, wherein in an assembled condition of the system, at least a part of the coarse filter is oriented parallel to the surface of the water or includes an acute angle with the surface of the water, and rainwater is upstream the coarse filter arranged to pass a position that is below that part of the coarse filter.
- 10 19 A system according to claim 17 or 18, wherein the at least one filter comprises downstream of the coarse filter a relatively fine filter that is configured to adsorb and capture at least one of Petroleum Hydrocarbons (TPH), Fats, Oils and Grease (FOG), oily sheen, microplastic particles and small rubber particles.
- 15 20 A system according to at least claim 14 and 19, wherein the relatively fine filter comprises a number of walls which are water permeable, wherein a downstream side of the walls preferably has a fluid communication with the outlet gutter or allows for water to flow away from the treatment volume.
- 20 21 A system according to claim 20, wherein the system is such that a downstream side of the walls forms the outlet gutter or forms at least partly other volume as referred to in claim 5 or 6.
- 22 A system according to claim 20 or 21, wherein the walls have at least partly the shape of pipes of which an upstream end is closed by a part of the walls and of which a downstream end streamlines a flow of filtered rainwater into the outlet gutter.
- 25 23 A system according to claim 22, wherein the longitudinal direction of the pipes are across the traffic direction of the road or parallel to the traffic direction of the road.
- 24 A system according to any one of the previous claims, wherein the road deck that covers one of the multi-functional plastic support structures, has a first part and a second part, wherein the first part, can be lifted independently of the second part, and wherein the first part extends at most up to a part of the width of the road.
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- 25 A system according to any one of the previous claims, wherein each of the plastic support structures of the plurality of plastic support structures is in structure the same, and preferably also in dimensions the same.
- 26 A system according to any one of the previous claims, wherein one out of at least 5,
5 preferably out of at least 10 and even more preferably at least out of 15 plastic support structures out of the plurality of support structures corresponds to one of the multi-functional plastic support structures.
- 27 A system according to any one of the previous claims, wherein a dimension of a road deck element in traffic direction of the road is able to span in an assembled condition of the
10 road at least two plastic support structures.
- 28 A system according to any one of the previous claims, wherein the road deck elements are shaped such that in an assembled condition of the system the road slightly slopes off towards one side of the road.
- 29 A system according to any one of the previous claims, wherein each road deck element
15 has a most upper road deck that in the assembled condition of the system slightly slopes off in one direction across a traffic direction of the road.
- 30 A system according to any one of the previous claims, wherein the treatment volume includes at least one part for facilitating sedimentation.
- 31 A system according to claim 30, wherein the at least one part for facilitating
20 sedimentation comprises a first part for facilitating sedimentation upstream the at least one filter.
- 32 A system according to any one of the previous claims 19-23, wherein the at least one part for facilitating sedimentation comprises a second part for facilitating sedimentation upstream the relatively fine filter.
- 25 33 A system according any one of the previous claims, wherein the treatment volume is at least partially delimited by impermeable material shaped for holding a volume of water.
- 34 A system according to claim 9 and 33, wherein the system is such that in an assembled condition of the system the inlet gutter extends through the impermeable material.
- 35 A system according to claim 14 and 33, wherein the system is such that in an assembled
30 condition of the system, the outlet gutter extends through the impermeable material.
- 36 A system according to claim 33, wherein the treatment volume is at least partly delimited by a downstream side of at least a part of the at least one filter.

- 37 A system according to any one of claims 33-36, wherein in the assembled condition the system comprises at least one overflow-exit and/or at least one pathway for aeration, preferably under the road deck.
- 38 A system according to any one of claims 33-37, wherein the treatment volume is provided with an overflow-exit for regulating that the treatment volume at most holds a volume of water that is equal to the treatment volume.
- 39 A system according to any one of claims 9-12, wherein in the assembled condition of the system, the inlet gutter parts adjacent the multi-functional support structure are provided with flow exits for releasing rainwater into the treatment volume.
- 40 A system according to any one of claims 14, 15, 16 and 17, wherein in the assembled condition of the system, the outlet gutter parts adjacent the plastic support structures which are different from the multi-functional support structure, are provided with flow exits for releasing filtered rainwater into volume under the other area of road deck.
- 41 A system according to claims 39 and 40, wherein in the assembled condition of the system, the flow exits for the inlet gutter parts for releasing rainwater into the treatment volume facilitate flow when a first height of water in the inlet gutter is reached, and the flow exits for the outlet gutter parts for releasing rainwater into volume under other road deck facilitate flow when a second height of water in the outlet gutter is reached, wherein the first and the second height are the same.
- 42 A system according to any one of the previous claims, wherein in the assembled condition of the system, the system provides at least one overflow exit facilitating release of water away from a footprint of the system when the amount of rainwater that is available for entering the treatment volume in a certain period of time is larger than the amount of rainwater that the treatment volume can refresh in that certain period of time.
- 43 A system according to any one of the previous claims, wherein in the assembled condition the system, the treatment volume comprises a pathway for aeration.
- 44 A system according to any one of the previous claims, wherein the at least one filter further comprises a floating dirt separator for separating floating dirt from the rainwater, wherein the floating dirt separator preferably includes an oil separator.
- 45 A system according to any one of the previous claims, wherein the system is provided with at least one sensor for detecting the status of the at least one filter, wherein status includes one of filter sensitivity, filter capacity, and pressure exerted onto the filter.

46 A method for capturing contamination out of rainwater that has flowed over a road deck, comprising:

- collecting rainwater that has flowed over a road deck to one or more rainwater collection points adjacent the road deck;
- 5 - allowing the collected rainwater to flow into a treatment volume;
- allowing floating dirt in the treatment volume to be separated from the rainwater;
- allowing the rainwater in a part of that treatment volume to flow through a relatively coarse filter;
- 10 - allowing the rainwater downstream of that coarse filter to flow through a relatively fine filter that is configured to capture at least one of Petroleum Hydrocarbons (TPH), Fats, Oils and Grease (FOG), oily sheen, microplastic particles and small rubber particles;
- allowing the rainwater downstream of that relatively fine filter to move away
- 15 from the treatment volume.

47 A method according to claim 46, wherein the treatment volume is underneath the road deck.

48 A method according to claim 46 or 47, wherein the collected rainwater is collected from parts of the road deck which are free from having underneath the road the treatment

20 volume.

49 A method according to claim 48, wherein the parts of the road deck that are free from having underneath the road the treatment volume, have underneath the road deck an attenuation system for temporarily storing rainwater before it permeates into the ground.

50 A method according to claim 49, wherein rainwater downstream of that relatively

25 fine filter moves into the attenuation system.

51 Use of a system of filters for removing contamination from rainwater, wherein the filter system is placed under a road.

52 Use of a system of filters according to claim 45, wherein the road is according to any of claims 1-45 in the assembled condition.

- 53 A support structure made of plastic and comprising a base plate and at least one supporting element, extending, or for extending, upwardly from the base plate for supporting at least partly a road deck element in a system according to any one of claims 1-45 wherein the support structure is provided with at least one filter for filtering rainwater that has entered a treatment volume, wherein the treatment volume is spanned by dimensions of the support structure, wherein at least a part of the at least one filter is oriented parallel to the surface of the water or includes an acute angle with the surface of the water, and/or wherein at least a part of the at least one filter is configured to adsorb and capture at least one of Petroleum Hydrocarbons (TPH), Fats, Oils and Grease (FOG), oily sheen, microplastic particles and small rubber particles, the at least one filter being positioned around and/or between the at least one supporting element, so that the support structure itself is unchanged by the presence or absence of the at least one filter.
- 54 A road having a road direction, the road comprising a plurality of road deck elements placed next to each other in at least the road direction, the plurality of road deck elements being supported by a plurality of plastic support structures, each of the plastic support structures comprising a base plate and at least one supporting element, extending, or for extending, upwardly from the base plate for supporting at least partly one of the road deck elements, the road deck being configured so that when rainwater falls onto the road deck, it predominantly flows away over the road deck to one or more rainwater collection points adjacent each support structure and/or each road deck element, wherein the road is provided with a treatment volume for removing contamination from rainwater that fall onto the road and wherein the plurality of plastic support structures comprises at least one multi-functional support structure which is provided with at least one filter for filtering rainwater, that has from the one or more rainwater collection points entered the treatment volume, wherein at least a part of the at least one filter is positioned within the treatment volume.
- 55 A road according to claim 54, wherein the road is provided with a number of fluid communications for replacement of water according to a predetermined route.
- 56 A road according to claim 55, wherein the number of fluid communications comprise a fluid communication of a first type, a fluid communications of a second type, and

preferably a fluid communication of a third type, wherein the fluid communication of the first type requires the presence of water to establish the communication under influence of the force of gravity, wherein the communication of the second type requires the presence of an amount of water in terms of a certain height relative to a height of a structural element, and wherein the fluid communication of the third type relies on the principle of interconnecting vessels.

57 A road according to claims 54-56, having a fluid communication of the first type between the road deck and the one or more rainwater collection points, and having a fluid communication of a first type and/or a fluid communication of a second type between the one or more collection points and the treatment volume.

58 A road according to any one of claims 54-57, wherein the treatment volume is spanned by dimensions of the multifunctional support structure and/or is within outer dimensions of the multifunctional support structure.

59 A road according to any one of claim 54-58, wherein the treatment volume excludes the one or more rainwater collection points.

60 A road according to any one of claims 54-59, wherein the road is configured so that rainwater which is collected by the one or more rainwater collection points and that has entered the treatment volume includes rainwater which has flowed over at least another area of road deck, wherein the other area of road deck is different from an area of road deck that covers that at least one multifunctional plastic support structure.

61 A road according to claims 54-61, wherein the road is configured such that rainwater which has been filtered by the at least one filter finds its way away from the treatment volume into other volume.

62 A road according to claims 61, having between the treatment volume and the other volume a fluid communication of the first type or a fluid communication the second type.

63 A road according to claims 60 - 62 wherein that other volume is covered by the other area of road deck.

64 A road according to claims 60 - 63 wherein the other area of road deck is area of road deck under which no such multifunctional plastic support structure is present.

- 65 A road according to any one of claims 60-64, wherein the other area of road deck is area of road deck under which an infiltration system is present for temporarily storing water before it permeates into the ground, or under which an attenuation system is present.
- 5 66 A road according to any one of claims 54-65, wherein the road is provided with an inlet gutter which extends in the road direction for functioning as rainwater collection points, and/or extends in a direction transverse to the road direction for functioning as rainwater collection points.
- 10 67 A road according to 60 and 66n wherein, the inlet gutter is configured for streamlining in the road direction a flow of rainwater of which at least some rainwater has flowed over the other area of road deck.
- 68 A road according to claim 60 or 66, wherein the inlet gutter is configured for collecting rainwater that has flowed over the area of road deck that covers one of the multi-functional plastic support structures.
- 15 69 A road according to any one of claims 66-68, the inlet-gutter is configured for letting rainwater flow into the treatment volume when the rainwater has reached a predetermined height in the inlet gutter.
- 70 A road according to anyone of the previous claims, wherein the treatment volume is in its entirety under area of road deck that covers that at least one multi-functional support structure.
- 20 71 A road according to any one of claims 64-70, wherein the road is provided with an outlet gutter, which extends in the direction of the road, for streamlining in the road direction a flow of rainwater that has been filtered by the at least one filter.
- 25 72 A road according to claim 71, configured so that rainwater which has been filtered by the at least one filter enters via the outlet gutter volume under the other area of road deck.
- 30 73 A road according to claim 72, wherein the road comprises under the other area of road deck an infiltration system for temporarily storing water before it permeates into the ground, and/or comprises under the other area of road deck an attenuation system.

- 74 A road according to any one of claims 54-72, wherein the at least one filter comprises upstream a coarse filter for filtering particles out of the water based on a mesh size of the filter.
- 5 75 A road according to claim 74, wherein at least a part of the coarse filter is oriented parallel to the surface of the water or includes an acute angle with the surface of the water, and wherein the configuration is such that rainwater upstream the coarse filter passes a position that is below that part of the coarse filter.
- 10 76 A road according to claim 74 or 75, wherein the at least one filter comprises downstream of the coarse filter a relatively fine filter that is configured to adsorb and capture at least one of Petroleum Hydrocarbons (TPH), Fats, Oils and Grease (FOG), oily sheen, microplastic particles and small rubber particles.
- 15 77 A road according to at least claim 74 and 76, wherein the relatively fine filter comprises a number of walls which are water permeable, wherein preferably a downstream side of the walls has a fluid communication with the outlet gutter or allows for water to flow away from the treatment volume.
- 78 A road according to claim 77, such that a downstream side of the walls forms the outlet gutter or forms at least partly other volume as referred to in claim 61.
- 20 79 A road according to claim 71 and 77, wherein the walls have at least partly the shape of pipes of which an upstream end is closed by a part of the walls and of which a downstream end is configured for streamlining a flow of filtered rainwater into the outlet gutter.
- 80 A road according to claim 79, wherein the longitudinal direction of the pipes are across the traffic direction of the road or parallel to the traffic direction of the road.
- 25 81 A road according to any one of the previous claims 54-80, wherein the road deck that covers one of the multi-functional plastic support structures, has a first part and a second part, wherein the first part, can be lifted independently of the second part, and wherein the first part extends at most up to a part of the width of the road.
- 30 82 A road according to any one of the previous claims 54-81, wherein each of the plastic support structures of the plurality of plastic support structures is in structure the same, and preferably also in dimensions the same.
- 83 A road according to any one of the previous claims 54-82, wherein one out of at least 5, preferably out of at least 10 and even more preferably at least out of 15 plastic

support structures out of the plurality of support structures corresponds to one of the multi-functional plastic support structures.

- 84 A road according to any one of the previous claims 54-84, wherein a dimension of a road deck element in traffic direction of the road is able to span in an assembled condition of the road at least two plastic support structures.
- 85 A road according to any one of the previous claims 54-85, wherein the road deck elements are shaped such that the road slightly slopes off towards one side of the road.
- 86 A road according to any one of the previous claims 54-85, wherein each road deck element has a most upper road deck that slightly slopes off in one direction across a traffic direction of the road.
- 87 A road according to any one of the previous claims 54-86, wherein the treatment volume includes at least one part for facilitating sedimentation.
- 88 A road according to claim 87, wherein the at least one part for facilitating sedimentation comprises a first part for facilitating sedimentation upstream the at least one filter.
- 89 A road according to any one of the previous claims 87 and 76, wherein the at least one part for facilitating sedimentation comprises a second part for facilitating sedimentation upstream the relatively fine filter.
- 90 A road according any one of the previous claims 54-89, wherein the treatment volume is at least partially delimited by impermeable material shaped for holding a volume of water.
- 91 A road according to claim 66 and 90, wherein the system is such that in an assembled condition of the system the inlet gutter extends through the impermeable material.
- 92 A road according to claim 71 and 90, wherein the road is such that the outlet gutter extends through the impermeable material.
- 93 A road according to claim 90, wherein the treatment volume is at least partly delimited by a downstream side of at least a part of the at least one filter.
- 94 A road according to any one of claims 90-93, wherein the road comprises at least one overflow-exit and/or at least one pathway for aeration, preferably under the road deck.

- 95 A road according to any one of claims 33-37, wherein the treatment volume is provided with an overflow-exit for regulating that the treatment volume at most holds a volume of water that is equal to the treatment volume.
- 96 A road according to any one of claims 66-68, wherein inlet gutter parts adjacent the multi-functional support structure are provided with flow exits for releasing rainwater into the treatment volume.
- 97 A road according to any one of claims 71 or 72, wherein the outlet gutter parts adjacent the plastic support structures which are different from the multi-functional support structure, are provided with flow exits for releasing filtered rainwater into volume under the other area of road deck.
- 98 A road according to claims 66 and 96, wherein in the assembled condition of the system, the flow exits for the inlet gutter parts for releasing rainwater into the treatment volume facilitate flow when a first height of water in the inlet gutter is reached, and the flow exits for the outlet gutter parts for releasing rainwater into volume under other road deck facilitate flow when a second height of water in the outlet gutter is reached, wherein the first and the second height are the same.
- 99 A road according to any one of the previous claims 54-98, wherein the road comprises at least one overflow exit facilitating release of water away from a footprint of the system when the amount of rainwater that is available for entering the treatment volume in a certain period of time is larger than the amount of rainwater that the treatment volume can refresh in that certain period of time.
- 100 A road according to any one of the previous claims 54-99, wherein in the assembled condition the system, the treatment volume comprises a pathway for aeration.
- 101 A road according to any one of the previous claims 54-100, wherein the at least one filter further comprises a floating dirt separator for separating floating dirt from the rainwater, wherein the floating dirt separator preferably includes an oil separator.
- 102 A road according to any one of the previous claims 54-101, wherein the system is provided with at least one sensor for detecting the status of the at least one filter, wherein status includes one of filter sensitivity, filtercapacity, and pressure exerted onto the filter.