

# The Legal Relevance of Nature-based Solutions for Sustainable Urban Development in South African Secondary Cities



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## Abstract

South Africa, like many other countries worldwide, strives for sustainable development. Increasing urbanisation and climate change are two of the main drivers of the global pursuit of sustainable development. Nature-based solutions have been receiving increasing attention as a possible way not only to move cities towards environmental resilience but also to aid them in their efforts to achieve sustainability. Nature-based solutions use natural structures and ecosystems to address certain challenges experienced in and around cities and share a clear link with sustainable urban development. Nature-based solutions further aim to address social issues such as human well-being, environmental issues such as loss of biodiversity, and economic issues such as food insecurity, while sustainable urban development requires the integration of social, ecological and economic factors. Secondary cities in South Africa have been found to be located advantageously to aid development in both urbanised and more rural areas. Sustainable urban development in these cities, and possibly nationally, could be promoted using nature-based solutions, but South African law needs to be receptive thereto. This note aims to highlight briefly how and to what extent the country's environmental law as applicable to local government is attuned to the idea of nature-based solutions for sustainable urban development with a focus on secondary cities.

## Keywords

Sustainable development; nature-based solutions; environmental law; local government law; secondary cities; South Africa.

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## 1 Introduction

Rapidly increasing urbanisation, growing concerns for environmental health, the impact of climate change, the increasing unequal distribution of wealth and high energy prices are only some of the factors that motivate governments worldwide to prioritise sustainable urban development.<sup>1</sup> Secondary cities<sup>2</sup> could, in theory, be ideally situated within the national structure of cities to realise the goal of sustainable urban development. These cities have been described as "a catalyst for more balanced and dispersed growth"<sup>3</sup> and they act as an economic and social link between large metropolises and rural areas.<sup>4</sup> Furthermore, many secondary cities are surrounded by large areas of natural habitat.<sup>5</sup>

Sustainable urban development has three prominent characteristics. Firstly, it has a future perspective and is concerned with the needs of the present and future generations.<sup>6</sup> Secondly, it is an on-going process and not an end-state.<sup>7</sup> Lastly, it perceives human and ecological health as equally important and inextricably interconnected.<sup>8</sup> Therefore, it makes sense that

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<sup>1</sup> Department of Environmental Affairs and Tourism 2008 [https://www.gov.za/sites/default/files/gcis\\_document/201409/nationalframeworkforsustainabledevelopmenta0.pdf](https://www.gov.za/sites/default/files/gcis_document/201409/nationalframeworkforsustainabledevelopmenta0.pdf); Elliott *Introduction to Sustainable Development* 1-2; Fiksel 2006 *Sustainability* 14-15; Gibson 2006 *Impact Assessment and Project Appraisal* 171-172; UN Habitat *World Cities Report 2020* 7, 11.

<sup>2</sup> Secondary cities are defined in section 2 of this note.

<sup>3</sup> John *Secondary Cities* 6.

<sup>4</sup> Roberts *Managing Systems of Secondary Cities* 21-22; John *Secondary Cities* 6.

<sup>5</sup> Marais *et al Outside the Core* 24, 44. See, for example, the dam and accompanying wetland found in the secondary city of Potchefstroom, the Vaal River found in the area of the secondary city of Emfuleni and the coastal environment in which the secondary city of George is situated as noted in Cilliers and Cilliers 2015 *Town and Regional Planning* 5, Marais *et al Outside the Core* 13, 15-16.

<sup>6</sup> Wheeler *Sustainable Urban Development* 55; Fiksel 2006 *Sustainability* 20; Bentivegna *et al* 2002 *Building Research and Information* 85; Brundtland Commission *Our Common Future* 41; Gibson 2006 *Impact Assessment and Project Appraisal* 171; Principle 3 of the *Rio Declaration on Environment and Development* (1992); Repetto *The Global Possible* 10; Department of Environmental Affairs and Tourism 2008 [https://www.gov.za/sites/default/files/gcis\\_document/201409/nationalframeworkforsustainabledevelopmenta0.pdf](https://www.gov.za/sites/default/files/gcis_document/201409/nationalframeworkforsustainabledevelopmenta0.pdf).

<sup>7</sup> Wheeler *Sustainable Urban Development* 56; Fiksel 2006 *Sustainability* 16; Bentivegna *et al* 2002 *Building Research and Information* 85.

<sup>8</sup> Wheeler *Sustainable Urban Development* 55-56; While, Jonas and Gibbs 2010 *Transactions of the Institute of British Geographers* 80-81; Fiksel 2006 *Sustainability*

governments are also turning to nature when striving for sustainable urban development.<sup>9</sup>

From the start it is important to state that nature-based solutions are perceived as an "umbrella concept" that includes many different plans and strategies such as green infrastructure and urban ecosystems.<sup>10</sup> Nature-based solutions entail the utilisation of systems and structures either provided by nature or inspired by nature to address pressing issues such as climate change, food and water security, disaster risk reduction, etcetera.<sup>11</sup> Nature-based solutions thus provide governments and urban planners with effective plans to realise the goal of sustainable urban development, since both nature-based solutions and sustainable urban development are concerned with the same environmental and societal challenges.<sup>12</sup>

Section 24 of the *Constitution of the Republic of South Africa*, 1996 (hereafter *Constitution*) provides every person with an environmental right and the *National Environmental Management Act* 107 of 1998 (hereafter *NEMA*) is the legislative measure enacted to ensure the realisation of this environmental right. The *NEMA*-principles set out in section 2 act as a framework for decision-making and these principles share a strong connection with almost every duty of local government as described in the *Local Government: Municipal Systems Act* 32 of 2000 (hereafter *Systems Act*).<sup>13</sup>

Against this background the question arises to what extent South African law is attuned to the idea of nature-based solutions for sustainable urban development in secondary cities. In order to fully enable these cities (and their local authorities) to utilise the benefits of nature-based solutions for

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16, 20; Yigitcanlar and Teriman 2015 *IJEST* 341-342; Principle 1 of the *Rio Declaration on Environment and Development* (1992); Bentivegna *et al* 2002 *Building Research and Information* 85; Elliott *Introduction to Sustainable Development* 20-21.

<sup>9</sup> Laforteza *et al* 2018 *Environmental Research* 431.

<sup>10</sup> Nesshöver *et al* 2017 *Science of the Total Environment* 1220; Cohen-Shacham *et al* *Nature-based Solutions* 10; Horizon 2020 Expert Group *EU Research and Innovation Policy Agenda* 24; Kotzé 2018 *Water Wheel* 28. Nature-based solutions are defined in part 2 of this note.

<sup>11</sup> See Cohen-Shacham *et al* *Nature-based Solutions* 5; European Commission date unknown [https://ec.europa.eu/info/research-andinnovation/research-area/environment/nature-based-solutions\\_en](https://ec.europa.eu/info/research-andinnovation/research-area/environment/nature-based-solutions_en); Nesshöver *et al* 2017 *Science of the Total Environment* 1216; Wamsler *et al* 2016 *Ecology and Society* 4-5; Timmermans *et al* 2017 *Town and Regional Planning* 33.

<sup>12</sup> Kithiia and Lyth 2011 *Environment and Urbanization* 262; Naumann *et al* 2013 [https://www.ecologic.eu/sites/files/publication/2013/unep\\_2013\\_eba\\_social\\_dimension\\_policy\\_series\\_12-small\\_nov\\_2013.pdf](https://www.ecologic.eu/sites/files/publication/2013/unep_2013_eba_social_dimension_policy_series_12-small_nov_2013.pdf); Werts-Kanounnikoff *et al* 2011 *Climate and Development* 144-145; Pasquini and Enqvist 2019 [https://www.africancentreforcities.net/wpcontent/uploads/2020/01/CSP\\_green-infrastructure\\_paper\\_LPasquini\\_JEnqvist\\_11.pdf](https://www.africancentreforcities.net/wpcontent/uploads/2020/01/CSP_green-infrastructure_paper_LPasquini_JEnqvist_11.pdf).

<sup>13</sup> Du Plessis 2009 *SAPL* 61-69.

sustainable urban development, legislation needs to be receptive. This note briefly examines this matter.

Firstly, the theory relating to the above-mentioned concepts, i.e., sustainable urban development, nature-based solutions and secondary cities, will be discussed. Then the focus will shift to South African environmental law and local government law. Secondary cities have been selected for the purposes of this research as they are growing in number and are often under-researched in comparison with South African metropolitan municipalities.<sup>14</sup> From the outset it is important to note that the legislative measures chosen are applicable to, and theoretically must be implemented by *all* urban areas. However, the discussion on secondary cities in particular aims to highlight how the functions of these type of cities could provide many local governments with a useful "tool" to provide the developmental benefits of nature-based solutions to more areas than only those in which nature-based solutions are implemented.<sup>15</sup>

## **2 Sustainable urban development, nature-based solutions and secondary cities**

### **2.1 Sustainable urban development**

The definition of sustainable development found in the *NEMA* mirrors the often-quoted Brundtland Commission's definition.<sup>16</sup> The definition is as follows:

Sustainable development means the integration of social, economic and environmental factors into planning, implementation and decision-making so as to ensure that development serves present and future generations.<sup>17</sup>

In line with this definition, South Africa sustainable urban development thus means that systems of government need to create and maintain a regulatory framework for social, economic and environmental systems to be integrated with one another.<sup>18</sup> This entails that social systems, the economy and ecosystems are rooted in each other and need to be considered as a "triple

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<sup>14</sup> See *inter alia* Donaldson, Marais and Nel "Secondary Cities" 122; Marais *et al Profiling Intermediate Cities* 9, 10; John *Secondary Cities* 7; Marais *et al Outside the Core* 1.

<sup>15</sup> See parts 2.3 and 5.

<sup>16</sup> Brundtland Commission *Our Common Future* 41.

<sup>17</sup> Section 1 of the *National Environmental Management Act* 107 of 1998 (*NEMA*).

<sup>18</sup> Department of Environmental Affairs and Tourism 2008 [https://www.gov.za/sites/default/files/gcis\\_document/201409/nationalframeworkforsustainabledevelopment0.pdf](https://www.gov.za/sites/default/files/gcis_document/201409/nationalframeworkforsustainabledevelopment0.pdf).

bottom line";<sup>19</sup> not as separate systems each functioning in isolation.<sup>20</sup> It is also stated that the integration of the three systems needs to happen and be assessed over time, as development goals are realised.<sup>21</sup>

It follows that the definition in South African law would contain the same basic elements (briefly mentioned above) as other globally accepted definitions of sustainable urban development. The definition suggests that sustainable development is a process rather than an end goal.<sup>22</sup> Gibson<sup>23</sup> echoes this by expressly stating that there is no end-state of sustainable urban development to be achieved. Furthermore, it is concerned with the needs of future generations. It therefore acknowledges the element of futurity and has a long-term perspective.<sup>24</sup> Lastly, it acknowledges the interconnectedness between human (social and economic) systems and ecosystems. This focus on the state of the environment, ecological health and the interdependence between human beings and the environment is evident in many definitions of sustainable urban development.<sup>25</sup>

## 2.2 Nature-based solutions

The term "nature-based solutions" has two generally accepted definitions,<sup>26</sup> but two basic elements can be identified in both. The first element is that natural or modified ecosystems must be protected and managed<sup>27</sup> or that systems and solutions inspired by nature must be introduced and

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<sup>19</sup> Department of Environmental Affairs and Tourism 2008 [https://www.gov.za/sites/default/files/gcis\\_document/201409/nationalframeworkforsustainabledevelopmenta0.pdf](https://www.gov.za/sites/default/files/gcis_document/201409/nationalframeworkforsustainabledevelopmenta0.pdf).

<sup>20</sup> Department of Environmental Affairs and Tourism 2008 [https://www.gov.za/sites/default/files/gcis\\_document/201409/nationalframeworkforsustainabledevelopmenta0.pdf](https://www.gov.za/sites/default/files/gcis_document/201409/nationalframeworkforsustainabledevelopmenta0.pdf).

<sup>21</sup> Department of Environmental Affairs and Tourism 2008 [https://www.gov.za/sites/default/files/gcis\\_document/201409/nationalframeworkforsustainabledevelopmenta0.pdf](https://www.gov.za/sites/default/files/gcis_document/201409/nationalframeworkforsustainabledevelopmenta0.pdf).

<sup>22</sup> Bentivegna *et al* 2002 *Building Research and Information* 85; Wheeler *Sustainable Urban Development* 56; Fiksel 2006 *Sustainability* 16; Gibson 2006 *Impact Assessment and Project Appraisal* 172.

<sup>23</sup> Gibson 2006 *Impact Assessment and Project Appraisal* 172.

<sup>24</sup> Wheeler *Sustainable Urban Development* 55-56; Fiksel 2006 *Sustainability* 20; Bentivegna *et al* 2002 *Building Research and Information* 87; Gibson 2006 *Impact Assessment and Project Appraisal* 172; Repetto *The Global Possible* 10.

<sup>25</sup> Wheeler *Sustainable Urban Development* 55-56; Fiksel 2006 *Sustainability* 20; Bentivegna *et al* 2002 *Building Research and Information* 87; Yigitcanlar and Teriman 2015 *IJEST* 341-342; Elliott *Introduction to Sustainable Development* 20-21; While, Jonas and Gibbs 2010 *Transactions of the Institute of British Geographers* 76-89.

<sup>26</sup> European Commission date unknown [https://ec.europa.eu/info/research-and-innovation/researcharea/environment/nature-based-solutions\\_en](https://ec.europa.eu/info/research-and-innovation/researcharea/environment/nature-based-solutions_en); Cohen-Shacham *et al Nature-based Solutions* 5.

<sup>27</sup> Cohen-Shacham *et al Nature-based Solutions* 2.

protected.<sup>28</sup> The second element is that the benefits provided by these ecosystems or structures would address social, economic and environmental challenges.<sup>29</sup> The definitions suggest the same goal for nature-based solutions: to address social, economic and environmental challenges incidental to urban development<sup>30</sup> and that such development should be achieved by using and protecting structures provided by or inspired by nature, for example modified and natural ecosystems.<sup>31</sup>

Nature-based solutions can effectively address developmental challenges and thus help ensure sustainable urban development. Nature-based solutions centre on green spaces and natural areas in and around cities.<sup>32</sup> Parks, green roofs, community gardens and treed walkways and streets, to name a few, create places for people to meet or exercise and enjoy improved air quality. They have a natural cooling effect, reduce storm water runoff and help curb water pollution.<sup>33</sup> They positively affect people's general happiness and quality of life by providing aesthetic and health benefits related to a cleaner environment.<sup>34</sup> In addition to these social benefits there are also environmental benefits such as helping cities to adapt to climate change, assisting in microclimate regulation, improving water control and enhancing biodiversity.<sup>35</sup> The economic benefits of nature-based solutions start with the conservation of resources. The quality and availability of natural resources such as water greatly affects the economy. Nature-based solutions, while conserving these resources and improving the management thereof, can also motivate businesses to use these resources more efficiently.<sup>36</sup> Food and water security are also closely

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<sup>28</sup> European Commission date unknown [https://ec.europa.eu/info/research-and-innovation/researcharea/environment/nature-based-solutions\\_en](https://ec.europa.eu/info/research-and-innovation/researcharea/environment/nature-based-solutions_en).

<sup>29</sup> European Commission date unknown [https://ec.europa.eu/info/research-and-innovation/researcharea/environment/nature-based-solutions\\_en](https://ec.europa.eu/info/research-and-innovation/researcharea/environment/nature-based-solutions_en); Cohen-Shacham *et al Nature-based Solutions 2*.

<sup>30</sup> Cohen-Shacham *et al Nature-based Solutions 5*.

<sup>31</sup> Cohen-Shacham *et al Nature-based Solutions 5*.

<sup>32</sup> Horizon 2020 Expert Group *EU Research and Innovation Policy Agenda 8*.

<sup>33</sup> Cohen-Shacham *et al Nature-based Solutions 7*; Horizon 2020 Expert Group *EU Research and Innovation Policy Agenda 8*; Elmqvist *et al 2015 Current Opinion in Environmental Sustainability 102*; Pataki *et al 2011 Frontiers in Ecology and the Environment 30-31*; Escobedo and Nowak 2009 *Landscape and Urban Planning 106-108*; Timmermans *et al 2017 Town and Regional Planning 31-33*.

<sup>34</sup> Horizon 2020 Expert Group *EU Research and Innovation Policy Agenda 8*; Cohen-Shacham *et al Nature-based Solutions 7, 72-75*; Elmqvist *et al 2015 Current Opinion in Environmental Sustainability 102, 105*; Wamsler *et al 2016 Ecology and Society 5-6*.

<sup>35</sup> Elmqvist *et al 2015 Current Opinion in Environmental Sustainability 102*; Pataki *et al 2011 Frontiers in Ecology and the Environment 28-30*; Escobedo and Nowak 2009 *Landscape and Urban Planning 108-109*; Cohen-Shacham *et al Nature-based Solutions 7*; Horizon 2020 Expert Group *EU Research and Innovation Policy Agenda 8, 50-58*; Nesshöver *et al 2017 Science of the Total Environment 1217*.

<sup>36</sup> Horizon 2020 Expert Group *EU Research and Innovation Policy Agenda 8*.

linked to the economic challenges cities experience. Nature-based solutions such as restoring and conserving wetlands, rivers and forests, address these challenges.<sup>37</sup> These strategies improve the quality of the livelihoods in the fishery industry, for instance, directly improve food and water security and can also create or enhance tourism centred on these wetlands, rivers and forests, for example.<sup>38</sup> In addition, all of these benefits have their own substantial contribution to make to the economy.

### 2.3 Secondary cities

Secondary cities, also known as intermediate cities, are on the second tier of the hierarchy of cities and although there is no official list of these cities in South Africa, the South African Cities Network (hereafter SACN) developed a classification.<sup>39</sup> These cities were initially identified based on the quasi-official lists issued by the National Treasury based on their being known as Category B municipalities (local municipalities)<sup>40</sup> as well as the size of their budgets, the size of their economies and the size of their populations.<sup>41</sup> A secondary city is therefore mainly identified in terms of its municipal area and not in terms of the town/city as an urban space in that area.<sup>42</sup> Since the first identification by the SACN until the present, the list has grown from 22 to 39 secondary cities.<sup>43</sup> The expansion of the list has been influenced largely by the size of the population.<sup>44</sup> Marais *et al*<sup>45</sup> however criticise this approach because according to the authors, the location and the function of cities are of equal importance. This expanded list nevertheless remains the main, unofficial list of secondary cities in South Africa. It lists cities such as Govan Mbeki, Matlosana, JB Marks and Polokwane.<sup>46</sup>

In South Africa secondary cities are home to nearly 27% of the country's population.<sup>47</sup> They can therefore substantially contribute towards

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<sup>37</sup> Naumann *et al* 2013 [https://www.ecologic.eu/sites/files/publication/2013/unep\\_2013\\_eba\\_social\\_dimension\\_policy\\_series\\_12-small\\_nov\\_2013.pdf](https://www.ecologic.eu/sites/files/publication/2013/unep_2013_eba_social_dimension_policy_series_12-small_nov_2013.pdf); Cohen-Shacham *et al* *Nature-based Solutions* 7.

<sup>38</sup> Cohen-Shacham *et al* *Nature-based Solutions* 7; Wamsler *et al* 2016 *Ecology and Society* 5-6; Naumann *et al* 2013 [https://www.ecologic.eu/sites/files/publication/2013/unep\\_2013\\_eba\\_social\\_dimension\\_policy\\_series\\_12-small\\_nov\\_2013.pdf](https://www.ecologic.eu/sites/files/publication/2013/unep_2013_eba_social_dimension_policy_series_12-small_nov_2013.pdf).

<sup>39</sup> John *Secondary cities in South Africa: the start of the conversation* 4, 6-7.

<sup>40</sup> See section 155(1) of the *Constitution* and the *Local Government: Municipal Structures Act* 117 of 1998 (hereafter *Structures Act*).

<sup>41</sup> John *Secondary Cities* 7.

<sup>42</sup> Marais *et al* *Profiling Intermediate Cities* 7.

<sup>43</sup> Marais *et al* *Profiling Intermediate Cities* 7.

<sup>44</sup> Marais *et al* *Profiling Intermediate Cities* 10.

<sup>45</sup> Marais *et al* *Profiling Intermediate Cities* 12.

<sup>46</sup> Marais *et al* *Profiling Intermediate Cities* 11.

<sup>47</sup> Marais *et al* *Profiling Intermediate Cities* 14.

distributing the population across the country.<sup>48</sup> By distributing the population more equally the cities accelerate growth across the whole country and not only in metropolitan areas.<sup>49</sup> The next important attribute of secondary cities is their location and connectedness. These cities are often close to metropolitan areas, but also far enough removed to provide an effective link between rural areas and metropolitan areas.<sup>50</sup> They provide health and financial services, schools, higher order goods and many sector-specific employment opportunities to surrounding areas, and thus have a considerable contribution to make to the national economy.<sup>51</sup>

### 3 South African environmental law

The environmental right in section 24 of the *Constitution* cannot be considered in the context of nature-based solutions and sustainable urban development without establishing the legal definition of the term environment. The definition in the *NEMA*<sup>52</sup> refers to "the physical, chemical, aesthetic and cultural"<sup>53</sup> surroundings of human beings, which include urban areas and the accompanying social issues.<sup>54</sup> This implicit inclusion of cities as being part of the environment is welcomed by academics. Kidd<sup>55</sup> states that for the right entrenched in section 24 to really serve people as human rights should, it should be concerned with all people's surroundings and not only natural surroundings.<sup>56</sup> Furthermore, Pieterse<sup>57</sup> is of the opinion that the wording of section 24(a) makes it possible to include cities and urban environments in the scope of the definition of the environment.<sup>58</sup>

Employing this definition of the environment that includes the natural dimensions of urban spaces (such as parks, community gardens, wetlands,

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<sup>48</sup> Marais *et al Profiling Intermediate Cities* 14; Donaldson, Marais and Nel "Secondary Cities" 135.

<sup>49</sup> John *Secondary Cities* 6.

<sup>50</sup> John *Secondary Cities* 6, Marais *et al Profiling Intermediate Cities* 43; Donaldson, Marais and Nel "Secondary Cities" 135.

<sup>51</sup> Donaldson, Marais and Nel "Secondary Cities" 133-135; John *Secondary Cities* 6; Marais *et al Profiling Intermediate Cities* 43.

<sup>52</sup> Section 1 of the *NEMA*: "environment" means the surroundings within which humans exist and that are made up of— (i) the land, water and atmosphere of the earth; (ii) micro-organisms, plant and animal life; (iii) any part or combination of (i) and (ii) and the interrelationships among and between them; and (iv) the physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and well-being". Also see Kidd "Environmental Management" para 335; Kidd *Environmental Law* 3-4; Du Plessis *Environmental Law* 12.

<sup>53</sup> Section 1 of the *NEMA*.

<sup>54</sup> Du Plessis *Environmental Law* 12.

<sup>55</sup> Kidd *Environmental Law* 22.

<sup>56</sup> Kidd *Environmental Law* 1, 22.

<sup>57</sup> Pieterse 2014 *SAPL* 181.

<sup>58</sup> Also see Cock 2007 *Labour, Capital and Society* 48; Glazewski *Environmental Law* 76. Also, Kidd's line of argumentation at Kidd *Environmental Law* 1, 22 as stated above seems to be in line with such an interpretation.

rivers, etcetera), means that the constitutional environmental right expects government to implement measures aimed at creating environmentally resilient cities.<sup>59</sup> This understanding of the term environment could suggest that both local government's environmental duty and section 152-duties would be founded in the urban area. Should local government employ nature-based solutions in cities as a means to achieve sustainable urban development, enhance public health and/or ensure climate change adaptation,<sup>60</sup> it would thus be adhering to both these duties.<sup>61</sup>

Next, the framework environmental legislation must be considered. The purpose of framework legislation is to provide "overarching and generic principles"<sup>62</sup> to serve as a foundation in which sectoral legislation can be rooted and to promote the constitutional principle of co-operative governance.<sup>63</sup> The *NEMA* is the principle framework environmental legislation enacted to give effect to section 24 of the *Constitution*.<sup>64</sup> Although the *National Water Act* 36 of 1998 (hereafter *National Water Act*) is viewed as a specific environmental management act,<sup>65</sup> it will be discussed as framework legislation to the extent that it also provides overarching legal principles of relevance for the present study.

The first consideration in terms of the *NEMA* is section 2. It sets out the principles that act as the framework for other environmental legislation and environmental decision-making.<sup>66</sup> The relevant section 2 principles directly refer to the protection, restoration and management of ecosystems, which is linked with the first element of nature-based solutions. One of these principles is enunciated in section 2(4), which states that ecological degradation, pollution and loss of biodiversity must be prevented. Section 2(2) ensures that people and their needs are the main focus of environmental management. The anthropocentric approach of these principles thus necessitates a focus on social issues, which construes the social challenges nature-based solutions aim to address.

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<sup>59</sup> Pieterse 2014 *SAPL* 182.

<sup>60</sup> See section 2 above for a reference to the more beneficial effects of nature-based solutions, any of which could have been listed without coming to a different conclusion.

<sup>61</sup> Pieterse 2014 *SAPL* 182-183.

<sup>62</sup> Nel and Du Plessis 2001 *SAJELP* 1.

<sup>63</sup> Nel and Du Plessis 2001 *SAJELP* 1-2; Du Plessis *Environmental Law* 22.

<sup>64</sup> Kidd *Environmental Law* 35.

<sup>65</sup> Kidd "Environmental Management" para 344.

<sup>66</sup> Section 2(1) of the *NEMA*; also see, *inter alia*, *WWF South Africa v Minister of Agriculture, Forestry and Fisheries* 2019 2 SA 403 (WCC) para 12; *Fuel Retailers Association of Southern Africa v Director-General: Environmental Management, Department of Agriculture, Conservation and Environment, Mpumalanga Province* 2007 6 SA 4 (CC) para 67.

Furthermore, sustainable development is a main theme and goal of the *NEMA* and it creates a framework in which nature-based solutions could fit, because the three dimensions of social, economic and environmental sustainability as encapsulated by the *NEMA* are also the three spheres in which nature-based solutions work. This is evident from repeated mention of sustainability throughout the Act,<sup>67</sup> the definition of sustainable development in section 1, and also references to sustainable development in a number of the section 2 principles.<sup>68</sup> Protection and restoration of ecosystems is another main goal of the *NEMA*,<sup>69</sup> which clearly relates to the first element of nature-based solutions.

Lastly, nature-based solutions are also reflected in integrated environmental management (hereafter IEM).<sup>70</sup> The objectives of IEM require that the section 2 principles must be integrated in environmental management and that the assessment of the impacts of activities and decisions must consider these principles as well as the relevant social, economic and environmental factors that are likely to be affected by the activity or decision.<sup>71</sup> As stated above, the principles accommodate the elements of nature-based solutions, and the consideration of social, economic and environmental factors directly links with the second element of nature-based solutions.

The second piece of legislation to be considered is the *National Water Act*. The definitions of water resources and watercourses include aquatic and riparian ecosystems<sup>72</sup> and therefore every reference in the Act to the protection of water resources or watercourses is also a reference to the protection of all aquatic and riparian ecosystems. In section 2 of the *National Water Act* explicit mention is made of the protection of the health and biodiversity of aquatic ecosystems as purposes of the Act.<sup>73</sup> It is clear that the first element of nature-based solutions can already be identified in the first few sections of the Act.

Furthermore, equitable access to water and the promotion of economic and social development are also factors mentioned throughout the Act.<sup>74</sup> The most evident mention of these factors is also found, *inter alia*, in section 2 pertaining to the purpose of the Act, section 6(2) that regulates water management areas, section 26 that contains the Minister's power to create regulations, and section 43 that expressly states equitable access to water

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<sup>67</sup> See the preamble and ss 2 and 12 of the *NEMA*.

<sup>68</sup> Sections 2(3) and 2(4) of the *NEMA*.

<sup>69</sup> See *inter alia* the preamble and ss 2, 24N(2)(f), 24O and 28 of the *NEMA*.

<sup>70</sup> See chapter 5 of the *NEMA*.

<sup>71</sup> Sections 23(2)(a)-23(2)(b) of the *NEMA*.

<sup>72</sup> Section 1 of the *National Water Act* 36 of 1998 (*National Water Act*).

<sup>73</sup> Sections 2(g) and 2(h) of the *National Water Act*.

<sup>74</sup> See, *inter alia*, ss 2(b), 2(e), 6(2), 16-18, 26, 43(1)(a) and 49(2) of the *National Water Act*.

as being one of the points of consideration when issuing licences. The second element of nature-based solutions is thus evident.

Other provisions of the Act such as the national water strategy (hereafter NWS),<sup>75</sup> the Minister's power to make regulations,<sup>76</sup> matters related to licences,<sup>77</sup> the powers and functions of catchment agencies<sup>78</sup> and the national monitoring system<sup>79</sup> all share some link with the protection of ecosystems. All of the sections that regulate the instances mentioned state that aquatic ecosystems must be protected.<sup>80</sup> For example, the NWS must ensure the protection of aquatic ecosystems<sup>81</sup> and the regulations that the Minister may make must control activities to ensure the protection of aquatic ecosystems.<sup>82</sup> This repeated reference to the protection of water resources therefore reinforces the accommodation of the first element of nature-based solutions in the *National Water Act*.

The discussion on environmental legislation is concluded with sectoral legislation. The following sectoral legislation are considered. Firstly, the *National Environmental Management: Biodiversity Act* 10 of 2004 (hereafter *NEMBA*), then the *National Environmental Management: Protected Areas Act* 57 of 2003 (hereafter *NEMPAA*) and lastly the *National Environmental Management: Integrated Coastal Management Act* 24 of 2008 (hereafter *NEMICMA*).

The *NEMBA* was promulgated to protect South Africa's biodiversity. Considering the broad definition of biodiversity, every reference to the conservation, management and protection of biodiversity is indirectly relevant to nature-based solutions since it will be a reference to the protection of ecosystems.<sup>83</sup> The *NEMBA*, however, also provides expressly and directly for the protection of ecosystems in provisions such as section 2, that lists the objectives of the Act,<sup>84</sup> section 11 that relates to the functions of the South African National Biodiversity Institute,<sup>85</sup> and also the whole of chapter 4.<sup>86</sup> It is thus clear that the first element of nature-based solutions; the protection of ecosystems, is deeply embedded in this Act.

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<sup>75</sup> Sections 5-7 of the *National Water Act*.

<sup>76</sup> Section 26 of the *National Water Act*.

<sup>77</sup> Sections 43(1)(d) and 49(2) of the *National Water Act*.

<sup>78</sup> Sections 77(1)(b) and 80(a) of the *National Water Act*.

<sup>79</sup> Sections 137(2) and 140(a) of the *National Water Act*.

<sup>80</sup> Sections 5-7, 26, 43(1)(d), 49(2), 77(1)(b), 80(a), 137(2) and 140(a) of the *National Water Act*.

<sup>81</sup> Sections 5-7 of the *National Water Act*.

<sup>82</sup> Section 26 of the *National Water Act*.

<sup>83</sup> Section 1 of the *National Environmental Management: Biodiversity Act* 10 of 2004 (*NEMBA*).

<sup>84</sup> Sections 2(a)(i) and 2(a)(iA) of the *NEMBA*.

<sup>85</sup> Section 11(1)(a) of the *NEMBA*.

<sup>86</sup> Section 51 of the *NEMBA*.

The second element, however, is less clear because there is no express provision in the *NEMBA* that social, economic or environmental challenges must be addressed in some way or other. Since environmental challenges could take the form of loss of biodiversity,<sup>87</sup> the *NEMBA*<sup>88</sup> provides for a part of this second element of nature-based solutions. As discussed above, the *NEMA* principles accommodate the entire second element of nature-based solutions.<sup>89</sup> The social and economic challenges are not addressed directly in the *NEMBA*, but since frameworks and plans, as required by the Act,<sup>90</sup> must be consistent with the *NEMA* principles and promote sustainable development,<sup>91</sup> it can be argued that the *NEMBA* implicitly and indirectly provides for the second element of nature-based solutions.

References to both elements of nature-based solutions are more express and direct in the *NEMPAA* than in the *NEMBA*. Considering the whole of chapter 3 of the Act, it becomes clear that the protection of ecosystems must be one of the main aims of the declaration of an area as a protected area as defined in section 9. Section 17 states that once an area is declared to be a protected area the purpose thereof must be to protect that ecosystem.<sup>92</sup> Another reference to the protection of ecosystems is found in section 20(2), which states that a national park may be declared to protect an ecosystem<sup>93</sup> and a nature reserve may be declared to supplement a national park and therefore also the area that is protected.<sup>94</sup> There is thus no doubt that the *NEMPAA* adequately fits the first element of nature-based solutions.

A similar conclusion can be drawn regarding the second element because the provisions of the *NEMPAA* are concerned with economic and social development. This can be seen in the repeated mention thereof in provisions such as section 20(2), which states that a national park may be declared if this would *inter alia* contribute to economic development in the area,<sup>95</sup> and section 23(2), which states that a nature reserve may be declared to support and promote recreation and eco-tourism.<sup>96</sup> In addition to the abovementioned purpose, section 17 also gives other purposes for declaring a protected area. These include the creation and promotion of

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<sup>87</sup> See part 2 above.

<sup>88</sup> Preamble of the *NEMBA*.

<sup>89</sup> See part 3 above.

<sup>90</sup> The national biodiversity framework, bioregional plans and biodiversity management plans as provided for in ss 39, 41 and 45 of the *NEMBA*.

<sup>91</sup> Sections 39, 41 and 45 of the *NEMBA*.

<sup>92</sup> Chapter 3 of the *NEMPAA*.

<sup>93</sup> Section 20(2)(a) of the *National Environmental Management: Protected Areas Act 57 of 2003 (NEMPAA)*.

<sup>94</sup> Section 23(a) of the *NEMPAA*.

<sup>95</sup> Section 20(2)(d) of the *NEMPAA*.

<sup>96</sup> Section 23(2)(e) of the *NEMPAA*.

eco-tourism<sup>97</sup> and the management of the relationships between economic and social development and ecological diversity.<sup>98</sup> The second element of nature-based solutions is therefore clear in the *NEMPAA*.

The *NEMICMA* also clearly refers to both elements of nature-based solutions. The Act provides for the creation of coastal public property and coastal protection zones for the purpose *inter alia* of protecting coastal ecosystems.<sup>99</sup> Section 23 also refers to the protection of coastal ecosystems and their biodiversity by stating this as a purpose for declaring a special management area. The main provisions for the protection of coastal ecosystems, however, are found in chapters 7 and 8 of the Act. These provisions are extensive and regulate a vast number of instances related to the protection of coastal ecosystems and their biodiversity.<sup>100</sup>

Furthermore, sections 7A and 17 mentioned above also directly entail that consideration must be given to both the social and economic factors that are related to the coastal environment and the communities situated in that environment.<sup>101</sup> Social issues such as land for housing and the livelihood of communities are explicitly mentioned in various sections of the Act<sup>102</sup> such as sections 23 and 49. Section 23 gives the enhancement of sustainable livelihoods as another purpose for declaring a special management area,<sup>103</sup> and section 49 obliges local government to ensure that social issues such as housing are addressed in management plans in terms of the Act.<sup>104</sup> Section 83 also refers to alleviating poverty and ensuring sustainable livelihoods in the context of the Minister's power to make regulations.<sup>105</sup>

The *NEMICMA* therefore protects the coastal ecosystem so that social, economic and environmental factors can enjoy the attention they should receive. This reflects the protection of ecosystems as the first element of nature-based solutions and also the second element of effectively addressing social, economic and ecological challenges.

#### 4 South African local government law

Chapter 7 of the *Constitution* provides for matters relating to local government. In section 152 the objects of local government are set out and

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<sup>97</sup> Section 17(i) of the *NEMPAA*.

<sup>98</sup> Section 17(j) of the *NEMPAA*.

<sup>99</sup> Section 7A(1)(b), 17(a) of the *National Environmental Management: Integrated Coastal Management Act 24 of 2008 (NEMICMA)*.

<sup>100</sup> See *inter alia* s 58-61, 63 and 69-73 of the *NEMICMA*.

<sup>101</sup> Sections 7A(1)(d) and 17(a) of the *NEMICMA*.

<sup>102</sup> See *inter alia* ss 23(c), 49(2)(c)(iv)-(v), 63(1)(e), 63(1)(g), 83(1)(b) and 83(1)(d) of the *NEMICMA*.

<sup>103</sup> Section 23(c) of the *NEMICMA*.

<sup>104</sup> Sections 49(2)(c)(iv)-(v) of the *NEMICMA*.

<sup>105</sup> Sections 83(1)(b) and 83(1)(d) of the *NEMICMA*.

two relevant objectives are firstly, that local government should promote economic and social development<sup>106</sup> and secondly, that local government should promote a healthy and safe environment.<sup>107</sup> These two objectives create a clear link with section 24 of the *Constitution*.<sup>108</sup> Section 8(1) and the objectives in section 152 thus ensure that local government promotes and realises the environmental right. Although these objectives are an "overarching set of obligations"<sup>109</sup> section 153(a) requires of local government to prioritise basic service delivery and economic and social development. Another important constitutional provision is contained in section 156, which empowers local government to control and administer matters listed in schedules 4 and 5.<sup>110</sup> Relevant matters that are listed are air pollution, tourism, parks and recreation, local amenities and public places.<sup>111</sup>

The constitutional autonomy and powers of local government expressly and implicitly relate to nature-based solutions. The *Constitution* creates an opportunity for secondary cities to turn to nature-based solutions by providing the municipality with the autonomy to create and administer functional areas directly relevant to nature-based solutions (for example parks, which are manifestations of nature-based solutions), and by imposing certain objectives on local government that nature-based solutions can help promote and achieve.

The *Systems Act*, the *Structures Act*, the *Spatial Planning and Land Use Management Act* 16 of 2013 (hereafter *SPLUMA*) and the *Local Government: Municipal Finance Management Act* 56 of 2003 (hereafter *MFMA*) are discussed in an attempt to determine if South African local government law is attuned to nature-based solutions for sustainable urban development in the country's secondary cities.

The *Systems Act* deals with the various duties of local government in ensuring compliance with local government's constitutional mandate.<sup>112</sup> When examining the Act in the context of this study, some definitions are important. The definition of a basic service in section 1 of the Act does not expressly refer to the protection of ecosystems; nor does it address societal, economic or environmental challenges as core elements of nature-based

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<sup>106</sup> Section 152(1)(c) of the *Constitution of the Republic of South Africa*, 1996 (the *Constitution*).

<sup>107</sup> Section 152(1)(d) of the *Constitution*.

<sup>108</sup> See part 3 above.

<sup>109</sup> *Joseph v City of Johannesburg* 2010 4 SA 55 (CC) para 35.

<sup>110</sup> Section 156(1)(a) of the *Constitution*.

<sup>111</sup> Schedules 4B and 5B of the *Constitution*.

<sup>112</sup> Preamble of the *Local Government: Municipal Systems Act* 32 of 2000 (*Systems Act*).

solutions.<sup>113</sup> The definition, however, could be interpreted to provide for nature-based solutions as a service that local government could provide the community with.<sup>114</sup> The reference to the environment being protected from harm by delivery of the service could relate to the first element of nature-based solutions<sup>115</sup> and the reference to public health and the quality of life of citizens could easily relate to the societal, economic and environmental challenges as the second element. Another important feature in section 1 is the definition of development. This definition expressly envisions sustainability *inter alia* on the social, environmental and economic fronts as some of the main focus areas of development.<sup>116</sup>

Furthermore, section 4 of the *Systems Act* imposes certain duties on local government that would ensure sustainability. Local government must ensure sustainable service delivery, promote and manage development with the use of integrated development plans (hereafter IDPs), and secure a safe and healthy environment.<sup>117</sup> Considering the definitions of basic services and development as discussed above, these duties of local government address the economic, societal and environmental issues that nature-based solutions are concerned with.<sup>118</sup> The duty to secure and promote a safe and healthy environment could relate to nature-based solutions in two ways. Firstly, the benefits of nature-based solutions, and secondly protecting ecosystems (the first element of nature-based solutions) could help local government establish a safe and healthy environment.

In section 19 the *Structures Act* repeats the section 152-duties of local government as imposed by the *Constitution*. Furthermore, the Act provides for the appointment, powers, functions and duties of mayors and/or executive committees.<sup>119</sup> The overall aim of the Act is to provide for the internal structures and functions of local government.<sup>120</sup> The *Structures Act* provides for different categories of municipalities and sets out all the structural provisions relating to each of these different municipalities.<sup>121</sup> By repeating the constitutional duties of local government, the Act incorporates to some extent the duties to secure a safe and healthy environment and provide adequate services to the people, but these brief provisions are not

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<sup>113</sup> Section 1 of the *Systems Act*.

<sup>114</sup> Section 1 of the *Systems Act*.

<sup>115</sup> See part 2.2 above and s 1 of the *Systems Act*.

<sup>116</sup> See part 2.1 above and s 1 of the *Systems Act*.

<sup>117</sup> Sections 4(2)(d), 4(2)(g), 4(2)(i), 4(2)(j) and 23 of the *Systems Act*.

<sup>118</sup> Sections 1 and 4 of the *Systems Act*.

<sup>119</sup> Sections 42, 44, 44(2)(c), 44(2)(d), 44(3)(e), 54, 56, 56(2)(c), 56(2)(d) and 56(3)(e) of the *Local Government: Municipal Structures Act* 117 of 1998 (*Structures Act*).

<sup>120</sup> Preamble of the *Structures Act*.

<sup>121</sup> See, *inter alia*, ch 1 of the *Structures Act*.

enough to conclude that this Act accommodates the idea of nature-based solutions.

Hence, the *Structures Act* makes no direct reference to anything that could be linked with nature-based solutions. It does, however, create processes and structures that would ensure efficient realisation of the objectives and duties of local government as contained in the *Constitution* and the *Systems Act*.

The *SPLUMA* states development principles in section 7. These development principles clearly provide for both elements of nature-based solutions.<sup>122</sup> The principle of spatial injustice in section 7(a) seeks to address societal challenges just as nature-based solutions do. Spatial sustainability in section 7(b) also shares links with nature-based solutions; by referring to viable communities and the protection of agricultural land, both economic and societal challenges are acknowledged. Section 7(c) contains the principle of efficiency and states that the impact that decisions may have on social, economic and environmental factors must be mitigated when these decisions are taken. The principle of resilience referenced in section 7(d) is concerned with how communities are equipped to absorb and recover from economic and environmental shocks, and again the challenges that nature-based solutions aim to address come to mind. It is therefore very clear that both elements of nature-based solutions can be identified in these principles.

Furthermore, the norms and standards regarding sustainable development that may be prescribed by the Minister,<sup>123</sup> the content of spatial development frameworks<sup>124</sup> and provisions related to land use schemes<sup>125</sup> expressly require the consideration of sustainability and social, economic and environmental factors and in some cases also the protection of ecosystems. Consideration of and providing for sensitive environments in these frameworks is an implicit reference to protecting ecosystems, and other explicit references are also present in the Act.<sup>126</sup> Lastly, land may be used for parks, shops, social gatherings and conservation without first having a land use scheme in place, which also indirectly accommodates both elements of nature-based solutions.<sup>127</sup>

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<sup>122</sup> See section 7 of the *Spatial Planning and Land Use Management Act* 16 of 2013 (SPLUMA).

<sup>123</sup> Section 8(2)(b) of the *SPLUMA*.

<sup>124</sup> Section 21 of the *SPLUMA*.

<sup>125</sup> Sections 25, 26 and schedule 2 of the *SPLUMA*.

<sup>126</sup> See *inter alia* ss 7, 21 and 25 of the *SPLUMA*.

<sup>127</sup> Section 26 and schedule 2 of the *SPLUMA*.

The *MFMA* is *inter alia* focussed on local government's ability to provide the community with basic services and realise its IDP.<sup>128</sup> Both the definitions of a basic service and of development are aligned with the definitions in the *Systems Act*.<sup>129</sup> According to the *MFMA* local government must consider the social, economic and environmental aspects of development to secure sustainable development by way of municipal IDPs.<sup>130</sup> The *MFMA* also prescribes that financial management must at all times be concerned with and focussed on local government's ability to provide basic services.<sup>131</sup> Thus, considering the fact that the definitions of a basic service and development are materially identical to those in the *Systems Act*, this Act therefore provides for nature-based solutions subject to the financial means of local government, by way of the close link this Act shares with the *Systems Act*.<sup>132</sup>

Since the *Systems Act* seems susceptible to nature-based solutions in terms of service delivery and the developmental duties of local government,<sup>133</sup> the *MFMA* could possibly be as well. The *MFMA* is aligned with the *Systems Act* in terms of provisions regarding the developmental objectives of local government and the realisation thereof. Furthermore, the *MFMA* does not state anything that is contrary to nature-based solutions in terms of the protection of ecosystems or the provisions of benefits that could address social, economic and environmental issues. The conclusion is therefore made that the *MFMA* refers to both elements of nature-based solutions in an indirect and implicit manner. These indirect references are either found in the text of the Act or in the close link that this Act shares with the *Systems Act*.

## 5 In conclusion: some observations

South African environmental law contains explicit references to both the elements of nature-based solutions, and also applies to the secondary city as an urban environment embedded in natural resources and natural processes.<sup>134</sup> In all but one of the legislative measures discussed in part 3 above, express mention is made of the protection and restoration of ecosystems and of ensuring that social, economic and environmental issues receive adequate attention.<sup>135</sup> Hence, it is possible to conclude that these legislative measures are largely attuned to nature-based solutions because

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<sup>128</sup> See, *inter alia*, ss 14, 21(1)(a), 21(2)(a)-(b), 48, 52(c) and 53 of the *Local Government: Municipal Finance Management Act* 56 of 2003 (*MFMA*).

<sup>129</sup> Section 1 of the *Systems Act*.

<sup>130</sup> See ss 21(1)(a), 21(2)(a)-(b) and 53(1)(b) of the *MFMA*.

<sup>131</sup> See *inter alia* ss 14, 48, 52(c) and 53 of the *MFMA*.

<sup>132</sup> Also see part 4 above.

<sup>133</sup> See part 4 above.

<sup>134</sup> See part 3 above.

<sup>135</sup> See part 3 above.

of their mainly explicit but also implicit references to both elements of nature-based solutions.

South African local government law is less evidently attuned to nature-based solutions. It is obvious that these legislative measures apply to municipalities as secondary cities, but most of the provisions address social and economic issues.<sup>136</sup> In most cases the protection of ecosystems must be read into local government's duty to provide a safe and healthy environment.<sup>137</sup> The local government law examined covers the entire spectrum with some provisions explicitly and/or implicitly providing for one or both of the elements<sup>138</sup> and other provisions making no reference at all to any of the two elements.<sup>139</sup>

Even though the broader legal framework seems to be attuned to the idea of nature-based solutions for sustainable urban development, putting theory into practice remains a great challenge. Governance challenges in the implementation of legal provisions, especially in secondary cities, such as the lack of capacity and resources, often causes implementation of environmental instruments such as nature-based solutions to either fail or not even be considered by local government at all.<sup>140</sup> These governance challenges would benefit from more in-depth research.

The role of local government as being responsible for the planning of urban spaces in the process of initiating and implementing nature-based solutions cannot be overemphasised.<sup>141</sup> Secondary cities are influential in their areas because of their connectedness with metropolitan and rural areas and their role as service centres, amongst others.<sup>142</sup> It is therefore recommended that local government's role in terms of providing social, economic and environmental benefits to communities while ensuring that ecosystems remain protected should be stated more expressly and that provision should be made for less conventional solutions, as nature-based solutions have been described.<sup>143</sup> This explicit mention of environmental duties and provisions for less conventional options could easily be incorporated in by-laws and regulative measures such as building regulations.<sup>144</sup> This would ensure certainty as to how the various actors in urban planning could integrate nature-based solutions in urban areas and could possibly move

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<sup>136</sup> See part 4 above.

<sup>137</sup> See part 4 above.

<sup>138</sup> See part 4 above.

<sup>139</sup> See part 4 above.

<sup>140</sup> Du Plessis *Environmental Law* para 3.3.6.

<sup>141</sup> Frantzeskaki 2019 *Environmental Science and Policy* 107.

<sup>142</sup> See part 2.3 above.

<sup>143</sup> Pasquini and Enqvist 2019 [https://www.africancentreforcities.net/wpcontent/uploads/2020/01/CSP\\_green-infrastructure\\_paper\\_LPasquini\\_JEnqvist\\_11.pdf](https://www.africancentreforcities.net/wpcontent/uploads/2020/01/CSP_green-infrastructure_paper_LPasquini_JEnqvist_11.pdf).

<sup>144</sup> Pasquini and Enqvist 2019 [https://www.africancentreforcities.net/wpcontent/uploads/2020/01/CSP\\_green-infrastructure\\_paper\\_LPasquini\\_JEnqvist\\_11.pdf](https://www.africancentreforcities.net/wpcontent/uploads/2020/01/CSP_green-infrastructure_paper_LPasquini_JEnqvist_11.pdf).

secondary cities to turn to these solutions, which might then have a ripple effect on the surrounding metropolitan and rural areas.

As this research focussed exclusively on the applicable law in a concise and introductory manner, in-depth research into the environmental and local government law, regulations and frameworks is undoubtedly required. Frameworks and plans such as the South African National Climate Change Adaptation Strategy provide useful insights into how the relevant legal provisions are to be implemented, but a detailed discussion in this topic falls outside the scope of this note and remains an area to be researched. It would seem that the law partially accommodates the use of nature-based solutions and that it applies to secondary cities but, as mentioned above, research evaluating the implementation thereof in secondary cities could also be performed. Keeping in mind the role of secondary cities,<sup>145</sup> this research could look into how the implementation of nature-based solutions in secondary cities would affect metropolitan, local and district municipalities' realisation of their legal mandates in terms of South African local government and environmental law and/or how the challenge of implementing it actually hinders the use of nature-based solutions in secondary and other cities.

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<sup>145</sup> See part 2.3 above.

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## List of Abbreviations

IDP	Integrated Development Plan
IEM	Integrated Environmental Management
IJEST	International Journal of Environmental Science and Technology
MFMA	Local Government: Municipal Finance Management Act 56 of 2003
NEMA	National Environmental Management Act 107 of 1998
NEMBA	National Environmental Management: Biodiversity Act 10 of 2004
NEMICMA	National Environmental Management: Integrated Coastal Management Act 24 of 2008
NEMPAA	National Environmental Management: Protected Areas Act 57 of 2003
NWS	National Water Strategy
SACN	South African Cities Network

SAJELP	South African Journal of Environmental Law and Policy
SAPL	Southern African Public Law
SPLUMA	Spatial Planning and Land Use Management Act 16 of 2 2013