SUPERVISOR'S USE ONLY

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91426

914260

Draw a cross through the box (☒) if you have NOT written in this booklet

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NZQA

Mana Tohu Mātauranga o Aotearoa
New Zealand Qualifications Authority

Level 3 Geography 2024

91426 Demonstrate understanding of how interacting natural processes shape a New Zealand geographic environment

Credits: Four

Achievement	Achievement with Merit	Achievement with Excellence
Demonstrate understanding of how interacting natural processes shape a New Zealand geographic environment.	Demonstrate in-depth understanding of how interacting natural processes shape a New Zealand geographic environment.	Demonstrate comprehensive understanding of how interacting natural processes shape a New Zealand geographic environment.

Check that the National Student Number (NSN) on your admission slip is the same as the number at the top of this page.

There is ONE question to answer in this booklet.

If you need more room for your answer, use the extra space provided at the back of this booklet.

Check that this booklet has pages 2–8 in the correct order and that none of these pages is blank.

Do not write in the margins (////). This area will be cut off when the booklet is marked.

YOU MUST HAND THIS BOOKLET TO THE SUPERVISOR AT THE END OF THE EXAMINATION.

Excellence

TOTAL 08

QUESTION

How do **interacting** natural processes create **spatial** OR **temporal** variations in a New Zealand geographic environment?

In your response:

- name a New Zealand geographic environment and the interacting natural processes that shape it
- construct a supporting annotated map or diagram in the space provided on page 3
- integrate comprehensive supporting case study evidence
- you may integrate other annotated maps and diagrams to support your answer.

You may use the space below to plan your response.

PLANNING

Spatial
- sand dunes at spit Okarina. ☆ coastal transport. w/ saltation & veg succ.
- intertidal & cliff of headland ☆ coastal erosion w/ sub-aerial.

Intro

Tectonic.

coastal erosion / sub-aerial.

volcanic at Taranaki

Beach. at headland

Beach at spit.

saltation

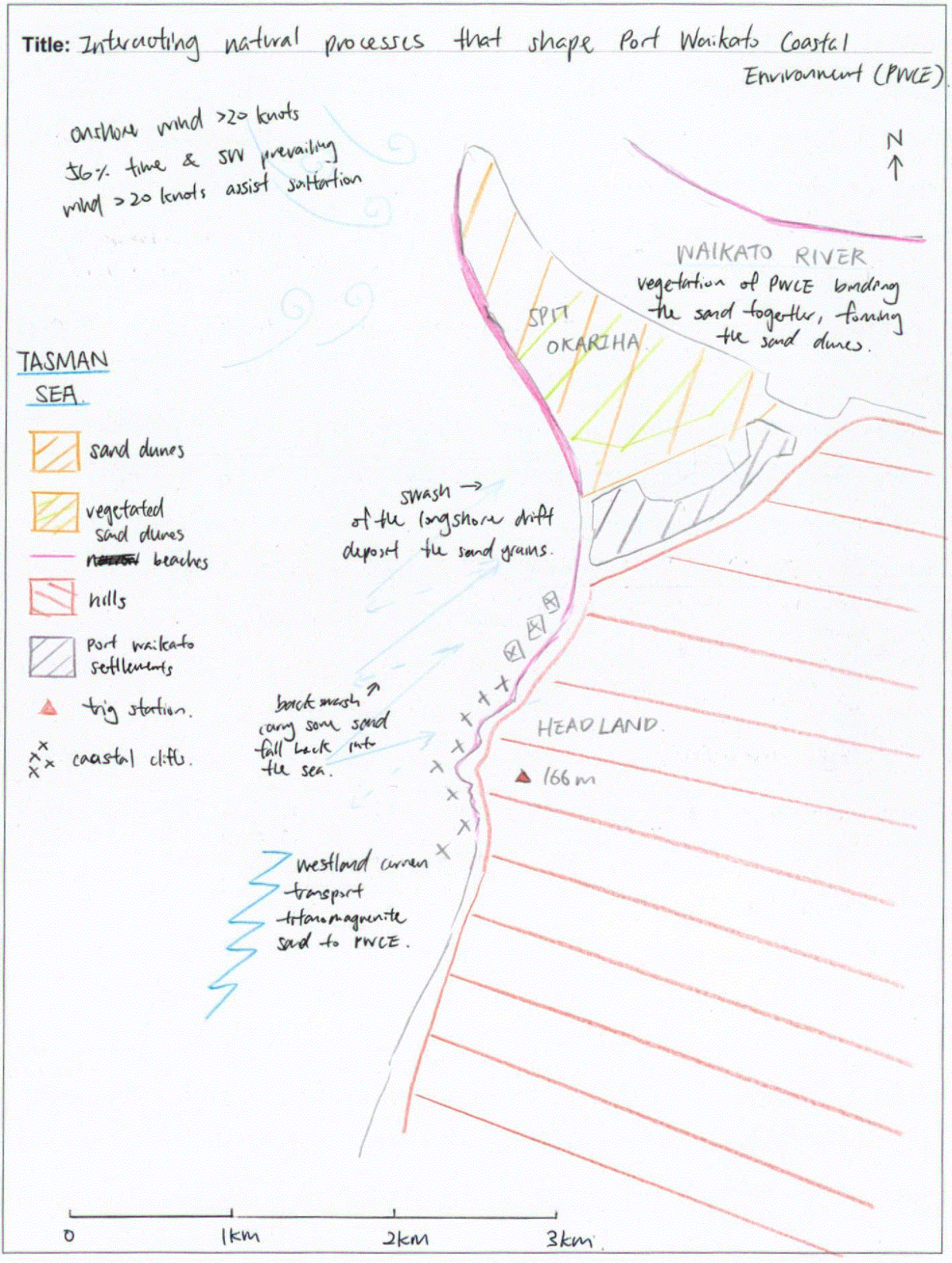
veg. succession.

Most imt. process why = larger scale, longer time, most impact. } Marine process.

conclusion.

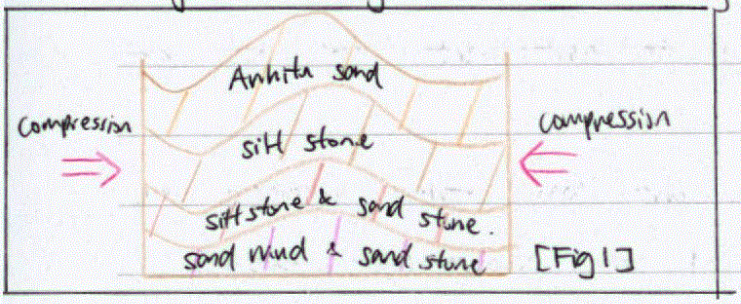
Chosen (✔) variation: ☑ Spatial ☐ Temporal

MAP/DIAGRAM



Port Waikato is located in North Island, New Zealand. It is 58 km SSW away from Auckland, on the southern bank of the Waikato River, boardered by the Tasman Sea. Port Waikato coastal environment (PWCE) is dynamic, always changing. Our study area covers 6.2 km², from the headland of the southern end of the Sunset Beach, to the northern end of the Okariha spit. Interacting natural process of marine process, tectonic movement, sub-aerial proses, saltation and vegetation succession process create the spacial variation, the two distinct natural features, the intertidal platform with cliffs, and the sand dunes of the spit. at PWCE.

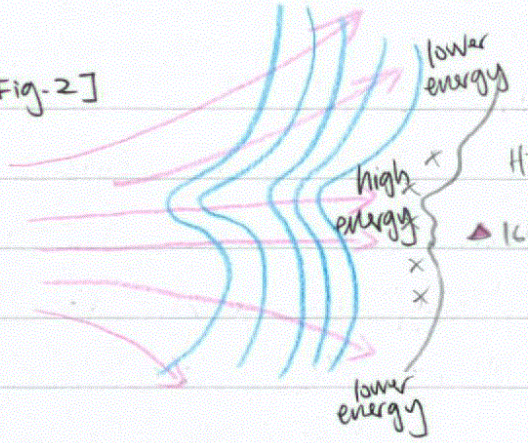
Tectonic movement result layers of sendimentary rocks of Gondwana being compressed. The 150 ~~y~~ million years old of graywacke and associated sendiments of Gondwana are compressed create ~~anticlyna~~ anticline and synclines. (Fig. 1). About twenty million years ago tectonic uplift then raised this compressed land mass above sea level. 6000 years ago the sealevel ~~rai~~ rise to its current level, this compressed landmass ~~eto~~ is shaped by other process, forming the land of PWCE, and the headland we see today at the southern end of the Sunset Beach.



[Fig 1]

Due to the unlimited 3000+ km fetch from the Southern Ocean, PWCE has strong southwesterly prevailing wind > 20 knots, This results in long period waves that carries high energy breaking violently towards the headland, eroding the cliffs. The wave refraction increase the concentration ~~rate~~ of higher energy of the waves breaking the cliffs, thus increase the rate of coastal erosion (Fig. 2) →.

[Fig-2]



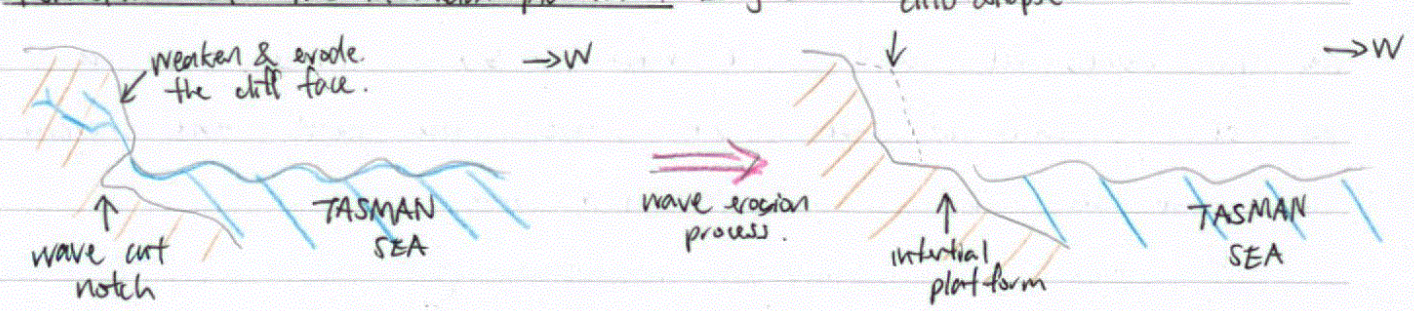
→ orthogonals ▲ trig station
× coastal cliffs ≀ waves.

Wave refraction at the headland PWCE.

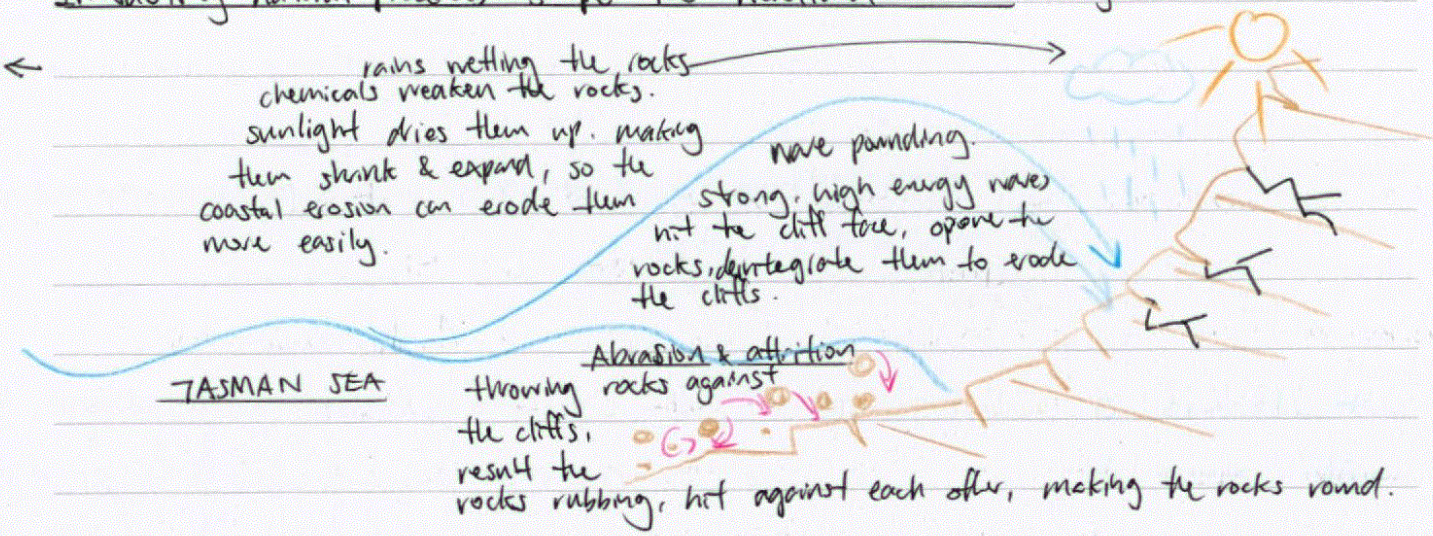
The coastal erosion, wave pounding and hydraulic pressure continuesly eroding the cliff face. Sub-aerial process of chemical and physical ~~wh~~ weathering works in conjunction with these coastal erosion processes. The chemicals in the rain can weaken the rocks of the cliffs, increase the rate of erosion. ~~The rain and the~~ PWCE has average of 1200 mm precipitation a year, and average annual temperature of 15°C. The rain and waves wet the cliffs, and the sunlight and heat drys the cliff, cause the rocks of cliffs expand and shrinks, weaken the cliff. Thus ~~with~~ the sub-aerial increase the rate of erosion, interacting with the ~~wave~~ coastal erosion processes ~~(Fig 3) coastal erosion forms the wave cut knot.~~ (Fig 3)

Wave / coastal erosion also forms wave cut notch that weaken the cliffs. eventually the cliffs collapse, form the significant nature feature, the intertidal platform of the headland (Fig 4.) The rocks of the cliffs will fall into the intertidal zone after erosion, and undergoes attrition and abrasion process, becoming more rounded smaller rock we see today, which is another characterist of the headland in PWCE. (Fig 3).

Formation of the intertidal platform. [Fig 4]



Interacting natural processes shape the headland. [Fig 3]



The volcanic process in Taranaki provide titanomegnetite sand for the formation of the narrow ~~xx~~ beach. The westland current and longshore drift deposite the sand to PNCE (page 3, map). The sand ~~xx~~ beach at the headland provide little protection to the cliffs. However overall it's at an eroding phase. The existence of the beach at the northen spit is mush more important, as the sand must lands on the beach ~~to~~ for the formation of the sand dunes, the variation, the other natural feature at PNCE. The beach here are build up by the titanomagnetite sand from Taranaki, and also the yellow white pumiceous sand from central Otago.

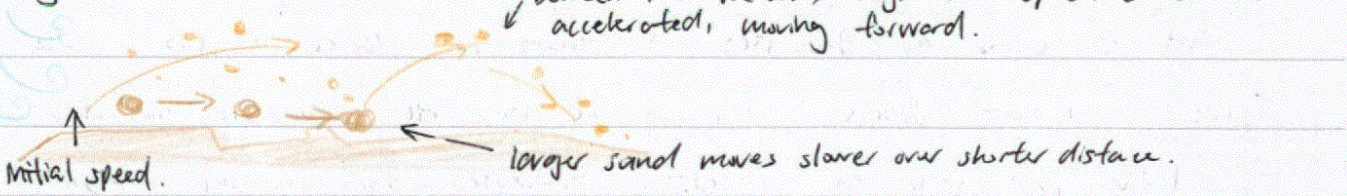
Port Naikoto has 50-70 m wide beach at low tide with a gentle slop about 5 degrees. PNCE has onshore wind > 20 knots and prevailing SW winds over 56% time. PNCE also has 15°C average annual temperature and 1900 hours of sunlight hours a year. All these conditions assist saltation process to move the sand grains, forming the sand dunes at the spit Okariha. (Fig 5). Surface creep a part of the saltation process, where the larger sand grains moving shorter distence, and the smaller sand grains moves faster and hit the larger grains, flicked upwards and/goes accelerating. This happens

(Fig 6)

at the spit Okariha. Eventually these sand particle will captured by the vegetation at PWCE, forming the sand dunes.

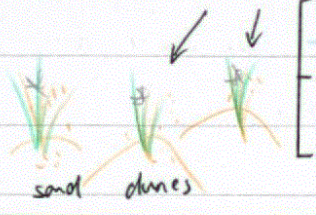
[Fig 5] Condition for saltation at the spit Okariha PWCE.

[Fig 6] Surface creep.



At the foredunes, spinifex and pingao reduce the wind speed and stop the deposition of the sand. They are xerophytic and halophytic with extensive root system to grow aggressively at the dunes and binding, colonising the dunes. Their ~~stifled~~ stifled leaves curved upwards to capture the sand, and their thick stem binding the sand together (Fig 7).

[Fig 7] spinifex & pingao.



As the sand movement slows down, and the builds up of sand dunes, the decomposing leaves can stay and provide materials for the soil development.

As the soil develops, other species can grow, such as pohuehue, marram grass growing at the mid to back dunes. Therefore the vegetation takes place, interacting with saltation, result in spacial variation, forming and shaping the sand dunes (vegetated sand dunes) at the northern part of the PWCE. continue. →

Extra space if required.
Write the question number(s) if applicable.

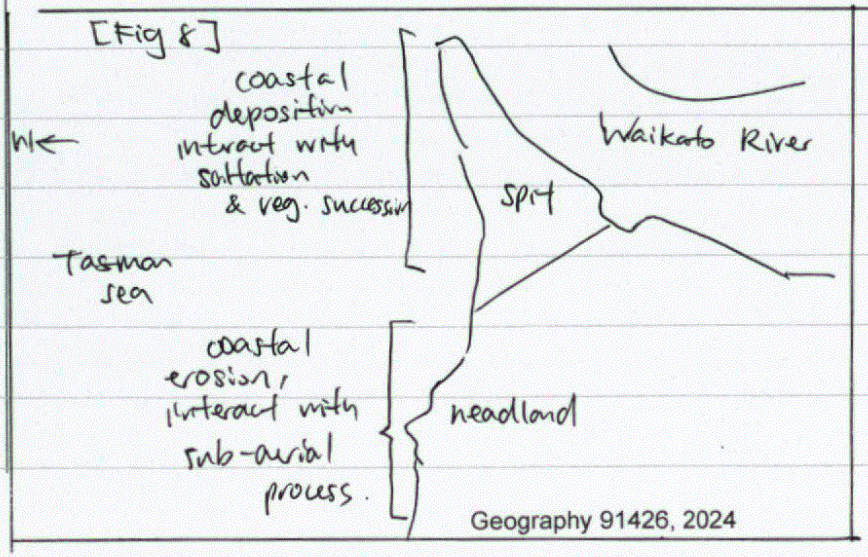
QUESTION NUMBER

91426

Within all the interacting natural processes. Marine process it's the most important process. Its coastal erosion continuously erode the cliffs at the head land, results formation of the intertidal platform. Its coastal transportation & deposition provid and transports materials for the beach which is crucial, the fundamental condition for the formation of sand dunes. Marine processes has larger scale, and longer time period of impact towards PWCE. Its rate of operation is also greater than that of other processes. So therefore marine process is the most important process that interacting with sub-aerial process, saltation and vegetation succession processes forming and shaping the two distinc features, spit sand dunes and the cliffs & intertidal platform, results such spacial variation at PWCE.

Over the last 20 million years tectonic movement, marine process, volcanic process, saltation, sub-aerial process and vegetation process works together create the spacial variation in PWCE. Coastal erosion dominates the headland area, shaping the cliffs and intertidal platform. On the northern end, coastal deposition dominates, forming shaping the sand dunes (Fig 8)

[Fig 8]



Excellence

Subject: Geography

Standard: 91426

Total score: 08

Grade score	Marker commentary
E8	The response has excellent diagrams throughout, which are generally clearly annotated with comprehensive supporting case study evidence. The response clearly shows insight that interacting processes operate to form different features, creating distinct spatial variations within the chosen geographical environment. Written evidence has a comprehensive amount of supporting case study evidence throughout.